5-4310-338-15

TM 5-4310-338-15 COMPRESSOR, ROTARY, AIR, DIESEL ENGINE DRIVEN,
TRAILER MOUNTED, 4 WHEEL 600 CFM—1970

TM 5-4310-338-15

TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT,
GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL

COMPRESSOR, ROTARY, AIR, DIESEL ENGINE DRIVEN, TRAILER MOUNTED, 4-WHEEL PNEUMATIC TIRED; 600 CFM, 100 PSI

(DAVEY MODEL 1M600RPV)
FSN 4310-136-4369

> This copy is a reprint which includes current pages from Changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY
October 1970

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READEX FICHE best copy available

SAFETY PRECAUTIONS

BEFORE OPERATION

Use extreme caution when handling fuel. Do not allow flame or smoking around fuel. Keep fuel free of water or dirt.

Do not smoke or allow open flames near charging batteries. Serious injury from explosion and acid may result. Avoid contact with electrolyte on clothing and flesh.

When lifting unit, lifting device must be capable of lifting a minimum of 12,000 pounds.

Always keep parking brakes locked whenever air compressor unit is not connected to a towing vehicle.

Never attempt maintenance or service on the compressor components until unit has been relieved of all air pressure.

Never attempt to disassemble any wheel until all air pressure is relieved from the tire.

Extreme caution must be taken to ensure that all air connections are tight. A loose connection can cause serious damage to air compressor or injury to personnel.

Do not operate air compressor unit in a building or closed area unless the exhaust gases are piped to the outside. Inhalation of exhaust gases can result in serious illness or death.

DURING OPERATION

Always keep parking brakes locked whenever air compressor unit is not connected to a towing vehicle.

Never attempt maintenance or service on air compressor components until the engine is shut down and unit is relieved of all air pressure.

Use only one shot of starting aid fuel for each engine start. Inject starting aid fuel only when engine is cranking. Improper use of starting aid fuel can cause severe engine damage.

Do not direct compressed air toward personnel as it can cause serious injury.

Do not touch exhaust system or turbocharger with bare hands while equipment is running or immediately after shut down. Exhaust system produces extreme heat and can cause serious burns.

Do not operate compressor with less than 80 PSI in seperator tank. If end use allows pressure to fall below 80 PSI, partially close air discharge valve. Equipment operation below 80 PSI causes overheating of compressor and excessive oil consumption.

If unit is shut down by safety devices, correct the malfunction before operation is continued.

AFTER OPERATION

Be certain that air valves are closed and all air pressure is relieved before disconnecting hoses from air discharge lines and securing the unit.

Never attempt maintenance or service on air compressor components until unit has been relieved of all air pressure.

Do not use flammable cleaning solvent to clean any part of air compressor unit. Use approved cleaning solvents only.

Always keep parking brakes locked whenever air compressor unit is not connected to a towing vehicle.

Correct or report any mechanical deficiencies that may result in damage to equipment or injury to personnel if operation is to be continued.

Changes in Force: C 1 and C 2

TM 5-4310-338-15
C 2

Change No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *29 June 1973*

Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual Compressor, ROTARY, AIR, DIESEL ENGINE DRIVEN, TRAILER MOUNTED, 4-WHEEL PNEUMATIC TIRED; 600CFM, 100 PSI DAVEY MODEL 1M600RPV) FSN 4310-136-4369

TM 5-4310-338-15, 16 October 1970, is changed as follows:

Cover. Inside the front cover, add the following:

NOTE

Before operating the equipment, refer to the safety precautions on the back of the rear cover of this manual.

Page 1-10. Immediately after table 1-2, the following note is added.

NOTE

Torque nuts on spring u-bolts at 130 foot-pounds.

Page 2-2. Paragraph 2-1.1 is added after paragraph 2-1.

2-1.1. Maintenance and Operating Supplies

The maintenance and operating supplies required for the initial 8 hours of operation of the compressor are contained in Table 2-1.1.

Table 8-1.1. Maintenance and Operating Supplies

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required f/initial operation	(5) Quantity required F/8 hrs operation	(6) Notes
CRANKCASE ENGINE		LUBRICATING OIL: 55 gal drum as follows:			(1) Includes quantity of oil to fill engine oil system as follows:
	9150-680-1104 (2)	HDO-30	29 qt 29 qt		27 qts--Engine 2 qts--Oil Filter
	9150-680-1105 (2)	HDO-10	29 qt		
	9160-342-7085 (2)	OES	29 qt		
GREASE POINTS		GREASE, AUTOMOTIVE AND ARTILLERY: 5 lb can as follows:	5 lb	(3)	(2) See C9100-IL: For additional data and requisitioning procedures
FUEL TANK		FUEL, DIESEL: bulk as follows:			
	9140-286-5294 (2)	DF-2	119 gal	(4) (4)	(3) See current 2.0 for grade application and replenishment intervals.
	9140-286-5286 (2)	DF-1	119 gal		
	9140-286-5283 (2)	DFA	119 gal	(4)	
OIL SEPARATOR, COMPRESSOR		LUBRICATING OIL; 55 gal drum as follows			
	9150-9437 (2)	OE-30	104 qts	(3)	(4) Average fuel consumption is 11 gal per hour of continuous operation
	9150-265-9430 (2)	OE-10	104 qts	(3)	
	9150-342-7605 (2)	OES	104 qts	(3)	(5) Ref. TM 5-4310-336-15 Table 2-1
RADIATOR		WATER ANTIFREEZE 5 gal can as follows:	66 qts		
	6850-224-8730	ETHYLENE GLYCOL type 1 ANTIFREEZE: 55 gal drum as follows:	(5)		
	6850-174-1806	Arctic grade	66 qts		

Page 2-2. Table 2-1 is superseded as follows:

Table 2-1. Freezing Points, Composition and Specific Gravities of Military Antifreeze Materials

Lowest expected ambient temp °F.	Pints of inhibited glycol per gallon of coolant 1	Compound, Antifreeze arctic 2	Ethylene glycol solution specific-gravity at 68°F. 3
+20		50-50 water-antifreeze solution (+20° to −30°)	
+10			1.022
0			1.036
−10			1.047
−20			1.055
−30			1.062
−40	Arctic anti-freeze preferred	DO NOT DILUTE WITH WATER OR ANY OTHER SUBSTANCE.	1.067
−50			1.073
−60			
−75			

1. Maximum protection is obtained at 60 percent by volume 1. Maximum protection is obtained at 60 percent by volume (4.8 pints of ethylene glycol per gallon of solution, −80 to −55).
2. Military specification MIL-C-11755-Arctic type, nonvolatile anti-freeze compound is intended for use in the cooling system of liquid-cooled internal combustion engines. It is used for protection against freezing primarily in Arctic regions where ambient temperatures remain for extended periods close to −40 F or drops below, to as low as −90 F.
3. Use an accurate hydrometer. To test hydrometer, use 1 part ethylene glycol antifreeze to 2 parts water. This should produce a hydrometer reading of 0°F.

NOTE

Fasten a tag near the radiator filler cap indicating the type antifreeze.

Page 2-3. The caution note following subparagraph 2-4*g* is superseded as follows:

CAUTION

Maximum towing speed is 20 miles per hour over unpaved roads and 10 miles per hour over uneven surfaced open fields.

Page 3-87. In figure 3-71, the arrow indicating the direction in which to turn the air pressure regulator handle is changed to show that a counterclockwise direction is required to decrease air pressure.

Page 7-6. Immediately after the paragraph heading of paragraph 7-9, add the following:

WARNING

Destroy used element to prevent accidental re-use. Over pollution of metal salts collecting on the element can become a hazardous condition by lowering the flash point and causing a fire in the oil separator.

NOTE

The oil separator element shall be replaced every 4000 hours of operation. This is necessary due to the deposit of metal salts on element as the oil is separated from the air. DO NOT attempt to clean the element or re-use the element because of its clean appearance.

Page B-1. Appendix B is superseded as follows:

APPENDIX B
BASIC ISSUE ITEM LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

B-1. Scope

This appendix lists basic issue items, items troop installed or authorized which accompany the compressor, and are required by the crew/operator for operation, installation or operator's maintenance.

B-2. General

This basic issue items, item troop installed or authorized list is divided into the following sections.

a. Basic Issue Items List—Section II. Not applicable.

b. Items Troop Installed or Authorized List—Section III. A list in alphabetical sequence of items which at the descretion of the unit commander may accompany the end item, but are NOT subject to be turned in with the end item.

B-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II, and Items Troop Installed or Authorized, Section III.

a. Source, Maintenance and Recoverability Code(s) (SMR): Not applicable.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A 2-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Authorized (Items Troop Installed or Authorized Only). This column indicates the quantity of the item authorized to be used with the equipment.

Section III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock number	(3) Description Ref. No. & Mfr code Usable on code	(4) Unit of meas	(5) Qty auth
	4210-555-8837	EXTINGUISHER, FIRE	EA	1

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25A (qty rqr block No. 42) organizational maintenance requirements for Air Compressor, 600 CFM.

TM 5-4310-338-15
C 1

Change }
No. 1 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C. *14 April 1972*

Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual

COMPRESSOR, ROTARY, AIR; DIESEL ENGINE DRIVEN; TRAILER MOUNTED, 4-WHEEL PNEUMATIC TIRED; 600 CFM, 100 PSI (DAVEY MODEL 1M600RPV)

FSN 4310-136-4369

TM 5-4310-338-15, 16 October 1970 is changed as follows:

On the back cover page, add the following safety precautions:

CAUTION, NOISE HAZARD

Continuous exposure to extremely high steady-state loud noises may result in significant loss of hearing. Personnel exposed to such noises should wear ear protection (Sound Aural Protector, FSN 4240-861-3612) when working in the area when unit is in operation.

CAUTION

Burnish parking brakes upon receipt of unit to assure proper seating of brakes before parking unit.

Page iii. Add the following titles to List of Illustrations:

Number	*Title*	*Page*
2-1.1	Trailer parking brake lever.	2-1
3-32.1	Instrument panel shield: removal and installation.	3-42

Page iv. Change title for figures 3-96 and 3-97 to read as follows:

Number	*Title*	*Page*
3-96	Oil filler assembly: removal and installation	3-112
3-97	Oil filler assembly: disassembly and reassembly	3-113

Add the following title to List of Illustrations

Number	*Title*	*Page*
3-97.1	Breather assembly: removal and installation	3-114.1

Page vii. Add the following to list of tables:

Number	*Title*	*Page*
1-3	Axle spring mounting torque table	1-10

Page 1-4. Paragraph 1-4 *b* (1), line 5 is changed as follows:

Serial Numbers	8P408-15330 through 8P408-15349, 8P408-15352 through 8P408-15361, 8P408-15819, 8P408-16711, 8P408-16760, 8P408-17301 through 8P408-17307

Paragraph 1-4 *b* (4), line 2 is changed as follows:

Engine crankcase	22 quarts

Paragraph 1-4 *b* (7). Paragraph *(c)* is added as follows:

(c) Torque screws, bolts, and nuts on axle spring mounting as indicated in table 1-3.

Page 1-10. Table 1-3 is added as follows:

Table 1-3. Axle Spring Torque Table

Description	Foot-Pounds	Size
Front shackle mounting	104	⅝-11 x 1¼ lg
Rear shackle mounting	45	½-13 x 1¼ lg
Front spring U-bolts	130	⅝ nut
Rear spring U-bolts	45	½ nut

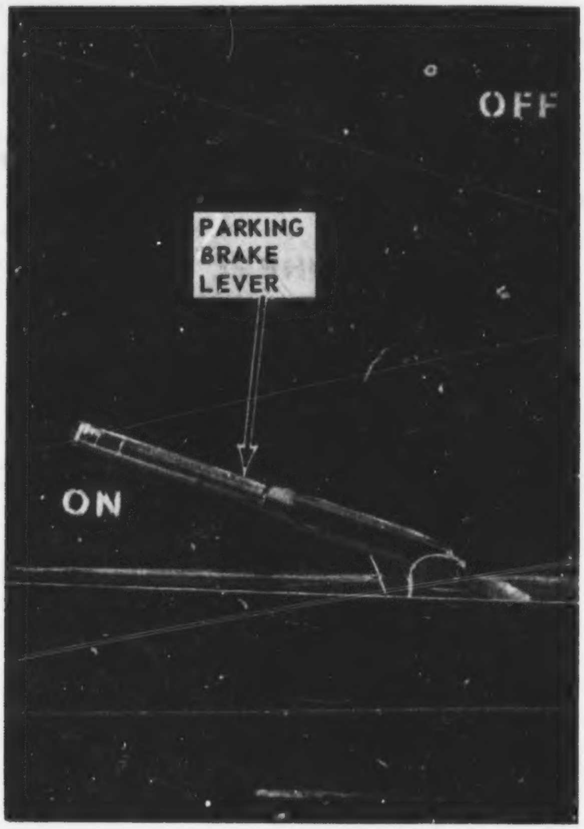
Page 2-1. Paragraph 2-1 *a* (2) is changed to read as follows and add warning after paragraph 2-1(2):

(2) Remove all blocks and tie downs that secure air compressor unit to carrier. Release parking brakes as shown in figure 2-1.1.

WARNING

Burnish parking brakes upon receipt of unit to assure proper seating of parking brakes before parking unit.

Page 2-1. Figure 2-1.1 is added as follows:



ME 4310-338-15/2-1.1 C1

Figure 2-1.1. Trailer parking brake lever.

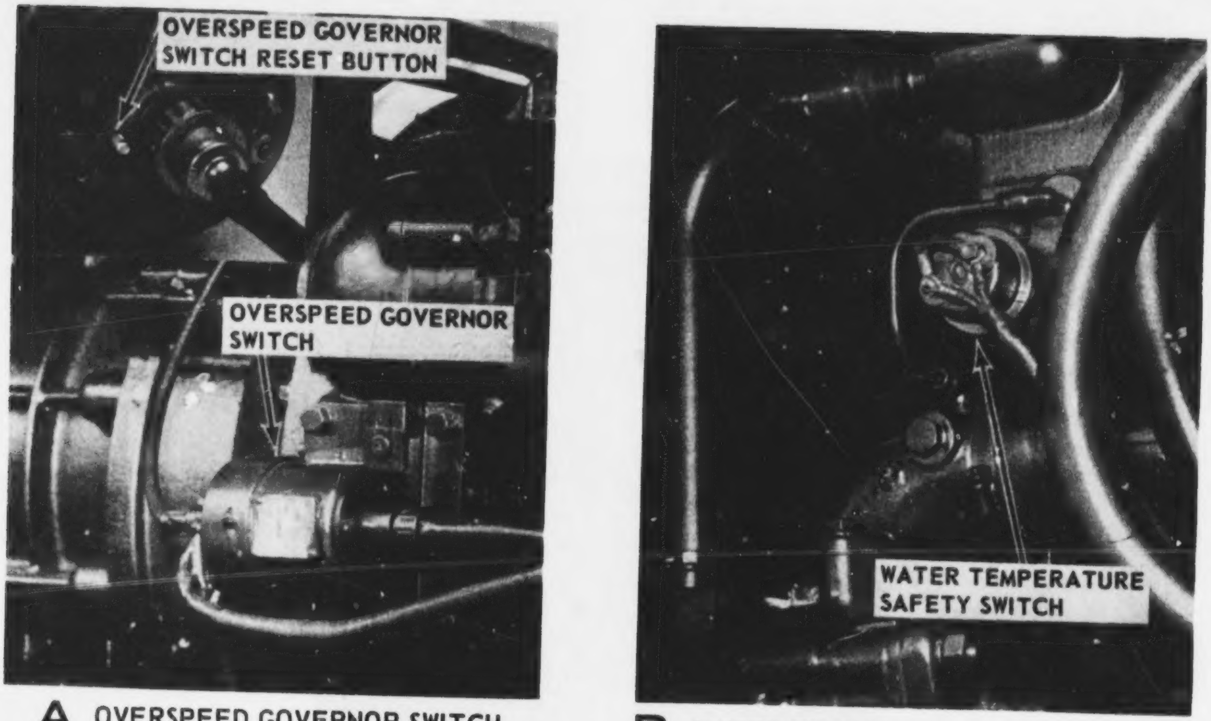
Page 2-2. Paragraph 2-3 *b* is changed to read as follows:

b. Lock parking brakes. Refer to figure 2-1.1.

Page 2-3. Paragraph 2-4 *g* is changed to read as follows:

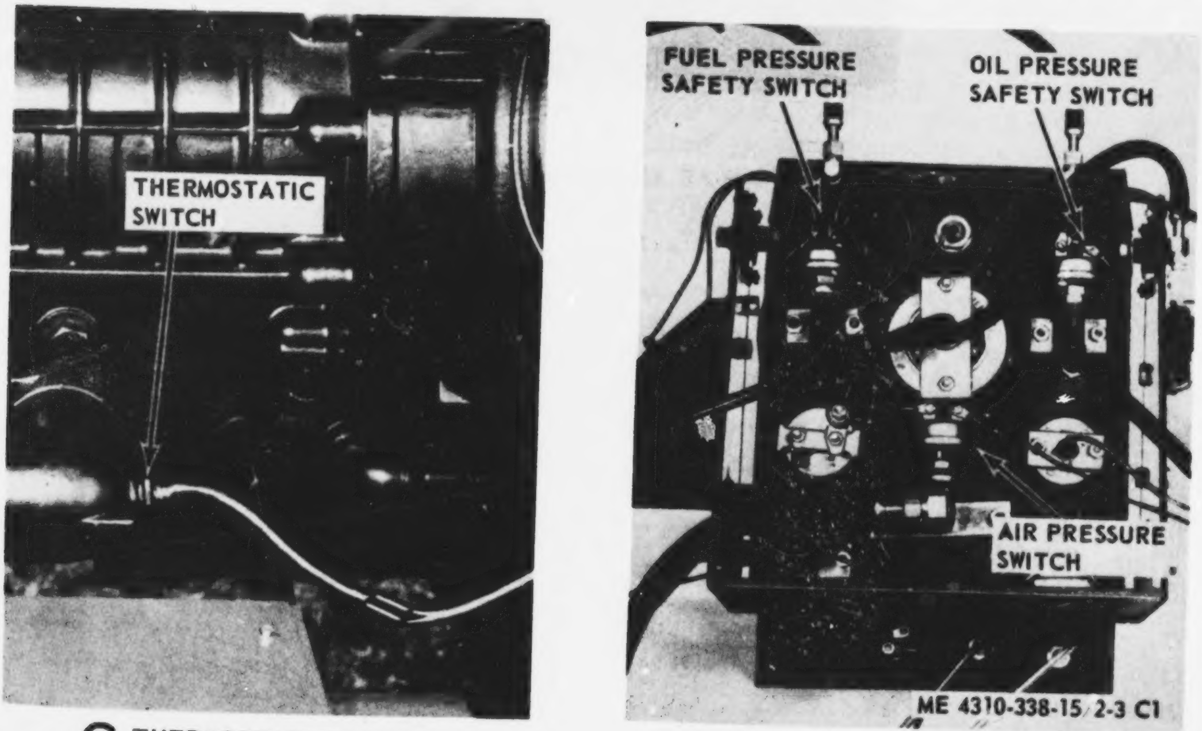
g. Release parking brakes. Refer to figure 2-1.1.

Page 2-6. **Figure 2-3 is superseded as follows:**


OVERSPEED GOVERNOR SWITCH RESET BUTTON
OVERSPEED GOVERNOR SWITCH
WATER TEMPERATURE SAFETY SWITCH

A OVERSPEED GOVERNOR SWITCH

B WATER TEMPERATURE SAFETY SWITCH


THERMOSTATIC SWITCH
FUEL PRESSURE SAFETY SWITCH
OIL PRESSURE SAFETY SWITCH
AIR PRESSURE SWITCH
ME 4310-338-15/2-3 C1

C THERMOSTATIC SWITCH

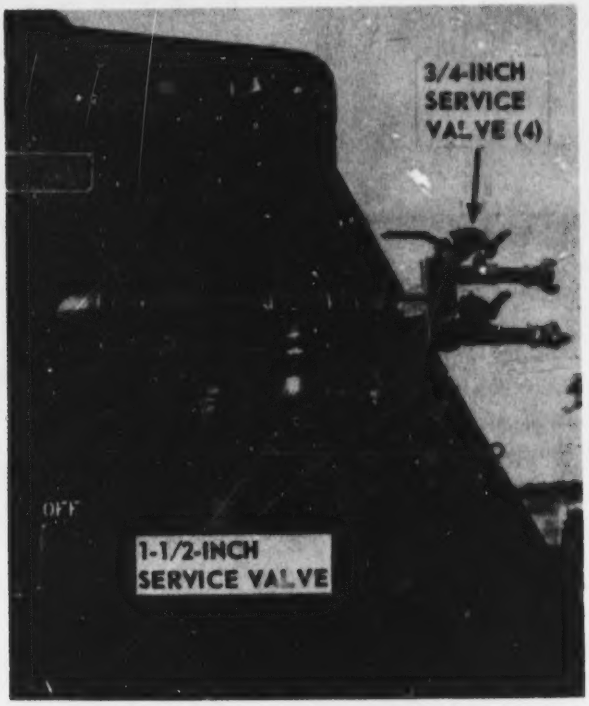
D PRESSURE SAFETY SWITCHES

Figure 2-3. Air compressor unit safety circuit switches.

Page 2-7. Paragraph 2-7 *b* (4) is superseded as follows:

(4) *Engine overspeed governor switch.* This is a centrifugal type switch which shuts down the engine if the RPM rate reaches an unsafe level. The switch when activated energizes the engine fuel rack shutoff solenoid, thus shutting off the engine. The overspeed switch must be manually reset after the switch has been energized by depressing the reset button as shown in figure 2-3.

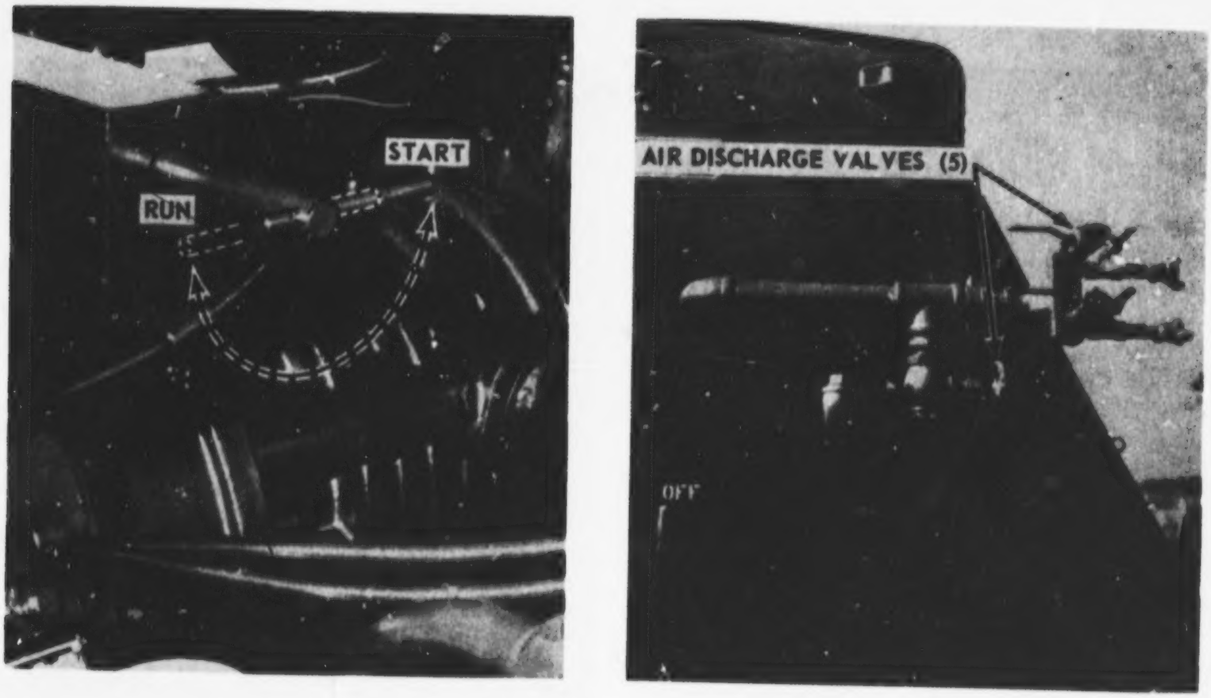
Page 2-8. Figure 2-7 is superseded as follows:



ME 4310-338-15/2-7 C1

Figure 2-7. Air discharge valves.

Page 2-11. **Figure 2-8 (sheet 2 of 3) is superseded as follows:**


START
RUN
AIR DISCHARGE VALVES (5)
OFF

ME 4310-338-15/2-8 ② C1

B RUN-START LEVER

C AIR DISCHARGE VALVES

Figure 2-8. Air compressor unit starting procedure. (sheet 2 of 3)

Page 2-12. Figure 2-8 (sheet 3 of 3) is superseded as follows:

STARTING PROCEDURE

CAUTION

DO NOT OPERATE COMPRESSOR WITH LESS THAN 80 PSI IN SEPARATOR TANK. IF END USE ALLOWS PRESSURE TO FALL BELOW 80 PSI, PARTIALLY CLOSE AIR DISCHARGE VALVES. EQUIPMENT OPERATION BELOW 80 PSI CAUSES OVERHEATING OF COMPRESSOR AND EXCESSIVE OIL CONSUMPTION.

CAUTION

OPERATOR MUST WEAR EAR PROTECTION IN THE WORKING AREA WHEN THE UNIT IS IN OPERATION.

STEP 1. OPEN ALL AIR DISCHARGE VALVES.

STEP 2. PLACE ENGINE SPEED CONTROL IN START POSITION. PULL ENGINE STOP CABLE ALL THE WAY OUT. PLACE HEAT-START SWITCH IN START POSITION AND ALLOW ENGINE TO TURN OVER FOR THREE SECONDS. RELEASE HEAT-START SWITCH, PUSH ENGINE STOP CABLE ALL THE WAY IN.

STEP 3. PRIOR TO STARTING, THE FUEL SYSTEM MUST BE PURGED OF AIR AND PRESSURIZED. OPEN VENT VALVE AND OPERATE FUEL PRIMING PUMP UNTIL A STREAM OF FUEL, WITHOUT AIR BUBBLES, FLOWS FROM VENT LINE. CLOSE VENT VALVE. LOCK PUMP HANDLE.

STEP 4. IF AMBIENT AIR TEMPERATURE IS BELOW +60°F., PLACE HEAT-START SWITCH IN HEAT POSITION AS RECOMMENDED IN TABLE 2-2.

CAUTION

IF AMBIENT TEMPERATURE IS +30°F. OR BELOW, USE ONLY ONE SHOT OF STARTING AID FUEL. EXCESSIVE STARTING AID FUEL CAN CAUSE SEVERE ENGINE DAMAGE. INJECT STARTING AID FUEL ONLY WHEN ENGINE IS CRANKING.

STEP 5. AFTER INDICATED HEAT TIME HAS ELAPSED, MOVE SWITCH TO START POSITION AND DEPRESS AND HOLD SAFETY SWITCH. IF AMBIENT AIR TEMPERATURE IS +32°F. OR BELOW, USE COLD WEATHER STARTING AID.

CAUTION

DO NOT HEAT GLOW PLUGS AFTER ENGINE IS RUNNING SMOOTHLY OR HAS REACHED OPERATING TEMPERATURE. IF ENGINE DOES NOT START AFTER CRANKING FOR 30 SECONDS, RELEASE START SWITCH AND LET STARTING MOTOR COOL FOR TWO MINUTES BEFORE ATTEMPTING ANOTHER START.

STEP 6. WHEN ENGINE STARTS, PLACE HEAT-START SWITCH IN HEAT POSITION UNTIL ENGINE IS RUNNING SMOOTHLY, THEN RELEASE TO OFF POSITION. RELEASE SAFETY SWITCH WHEN ENGINE OIL PRESSURE IS NORMAL.

STEP 7. CHECK ALL GAGES DURING WARMUP PERIOD TO ENSURE EQUIPMENT IS OPERATING PROPERLY.

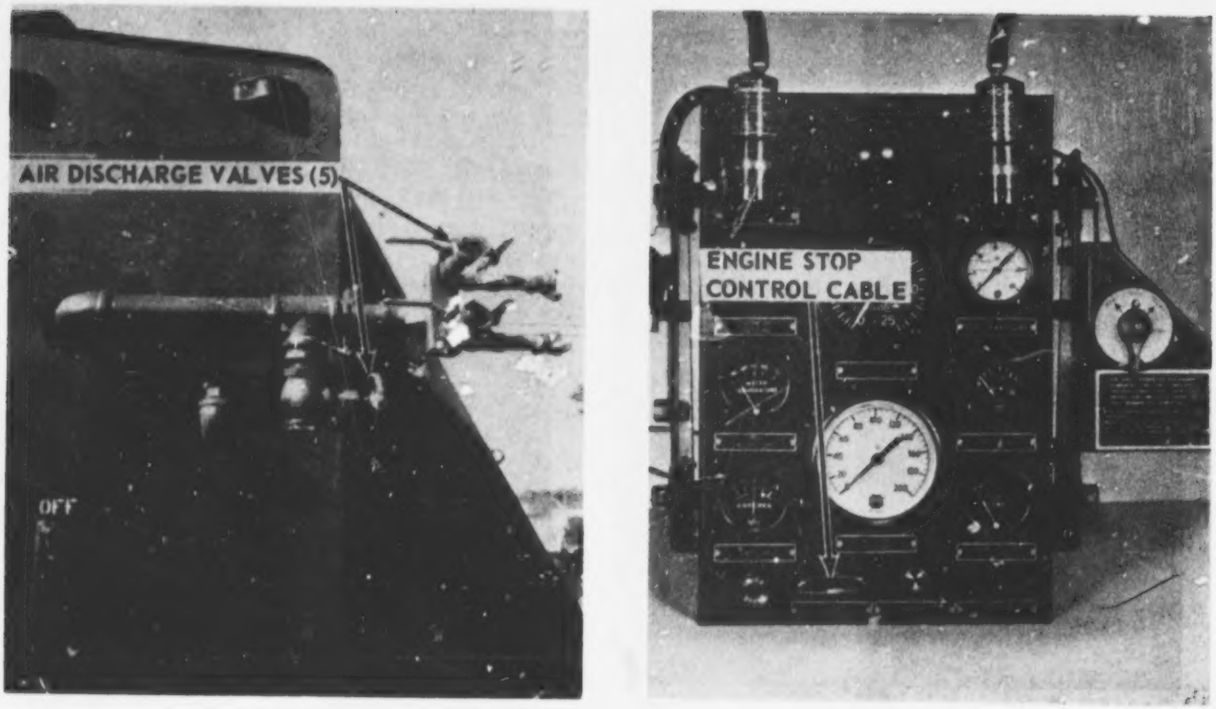
STEP 8. CLOSE ALL AIR DISCHARGE VALVES.

STEP 9. WHEN ALL SYSTEMS REACH OPERATING TEMPERATURES, PLACE SPEED CONTROL RUN-START LEVER IN RUN POSITION.

ME 4310-338-15/2-8 ③ C1

Figure 2-8. Air compressor unit starting procedure. (sheet 3 of 3)

Page 2-13. Figure 2-9 is superseded as follows:


AIR DISCHARGE VALVES (5)
OFF
ENGINE STOP CONTROL CABLE

ME 4310-338-15/2-9C1

STOPPING PROCEDURE

STEP 1. CLOSE ALL AIR DISCHARGE VALVES. ENGINE SHOULD RETURN TO IDLE POSITION.

STEP 2. ALLOW ENGINE TO IDLE FOR FIVE MINUTES

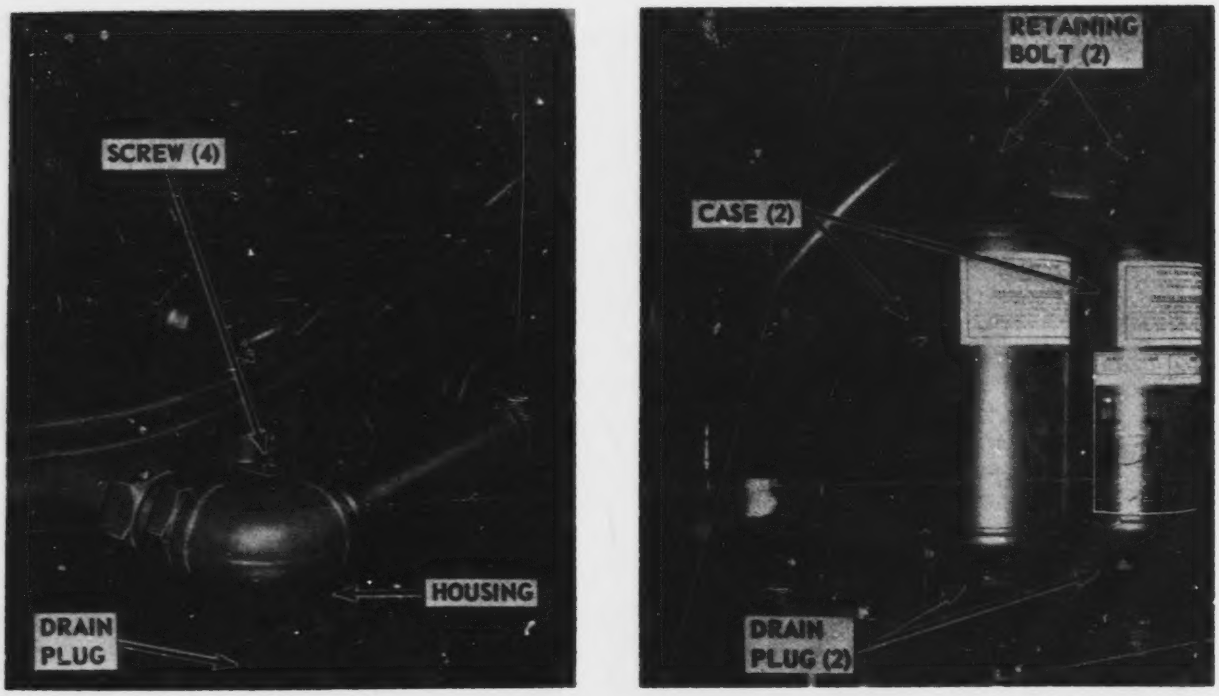
STEP 3. UNLOCK AND PULL ENGINE STOP CONTROL. COMPRESSED AIR WILL AUTOMATICALLY BLOW DOWN AFTER ENGINE IS STOPPED.

Figure 2-9. Air compressor unit stopping procedure.

Page 3-3. Table 3-1, Item number 7 in the Procedure column is changed to read as follows:

Clean filter element.

Page 3-6. Figure 3-3 is superseded as follows:



NOTE

STOP ENGINE BEFORE SERVICING COMPRESSOR OIL FILTER. SERVICE AFTER EACH 100 HOURS OF OPERATION.

STEP 1. REMOVE DRAIN PLUG AND DRAIN OIL FROM HOUSING. REPLACE DRAIN PLUG.

STEP 2. REMOVE SCREWS. REMOVE HOUSING AND ELEMENT.

STEP 3. CLEAN HOUSING, HEAD ASSEMBLY, AND ELEMENT USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 4. INSTALL A NEW GASKET INSTALL HOUSING AND SECURE WITH SCREWS.

A COMPRESSOR OIL FILTER

NOTE

STOP ENGINE BEFORE SERVICING ENGINE OIL FILTER ASSEMBLY. SERVICE AFTER EACH 100 HOURS OF OPERATION.

STEP 1. REMOVE DRAIN PLUGS AND DRAIN OIL FROM CASES. REPLACE DRAIN PLUGS.

STEP 2. UNSCREW CASE RETAINING BOLT AND REMOVE CASES AND ELEMENTS.

STEP 3. CLEAN CASES AND HEAD ASSEMBLY USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 4. INSTALL NEW ELEMENTS AND GASKETS. INSTALL CASES AND RETAINING BOLTS. TIGHTEN BOLTS.

B ENGINE OIL FILTER

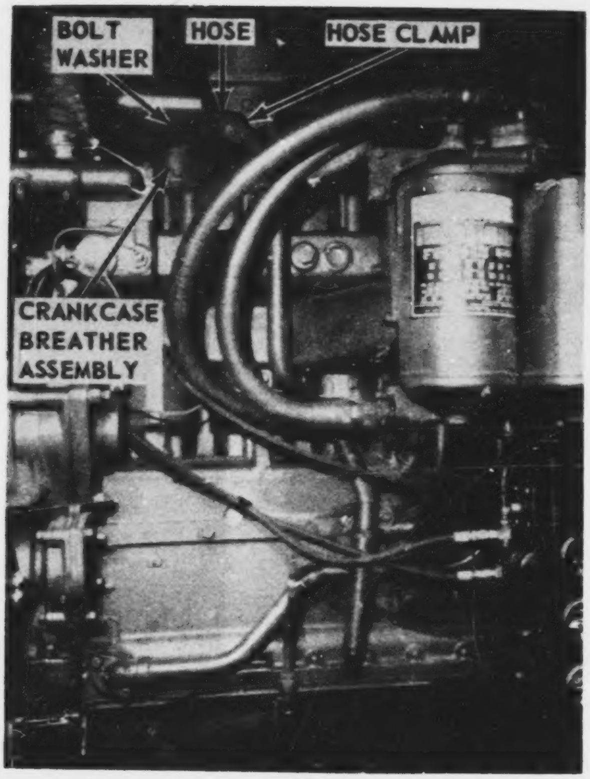
Figure 3-3. Oil filter service.

Page 3-7. Paragraph 3-10 is superseded as follows:

3-10. Engine Crankcase Breather Service

Service engine crankcase breather as shown in figure 3-4.

Page 3-7. Figure 3-4 is superseded as follows:



ME 4310-338-15/3-4 C1

STEP 1. LOOSEN HOSE CLAMP AND DISCONNECT HOSE FROM BREATHER ASSEMBLY.

STEP 2. REMOVE BOLT AND LOCKWASHER. REMOVE BREATHER ASSEMBLY AND GASKET.

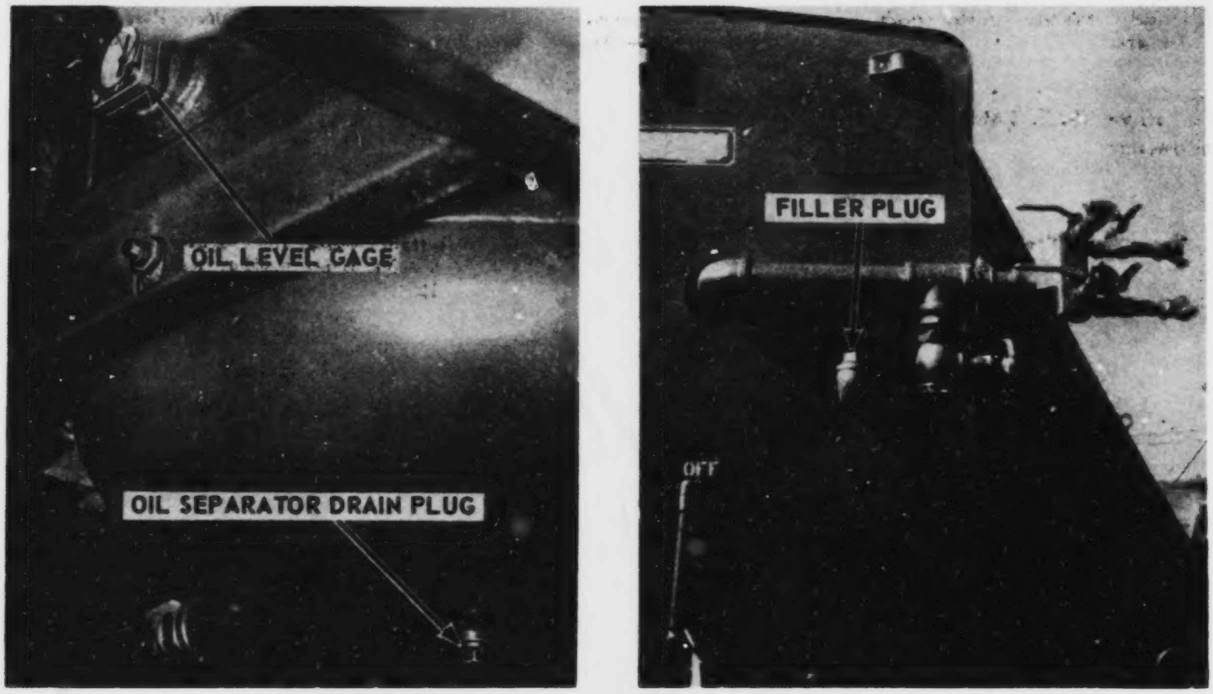
STEP 3. CLEAN BREATHER ASSEMBLY USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 4. INSTALL A NEW GASKET AND SECURE BREATHER ASSEMBLY WITH BOLT AND LOCKWASHER.

STEP 5. ATTACH HOSE TO BREATHER ASSEMBLY AND TIGHTEN HOSE CLAMP.

Figure 3-4. Engine crankcase breather service.

Page 3-17. Figure 3-16 is superseded as follows:



ME 4310-338-15/3-16 C1

STEP 1. CHECK OIL LEVEL GAGE FOR PROPER COMPRESSOR OIL LEVEL. FILL TO PROPER LEVEL. REFERENCE LUBRICATION ORDER LO5-4310-338-12.

STEP 2. CLEAN OIL SEPARATOR OIL LEVEL GAGE AND FILLER WITH A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

Figure 3-16. Oil separator service.

Page 3-21. Table 3-2, Item 2 is changed as follows:

Probable cause	*Corrective action*
m. Overspeed governor switch activated.	*m.* Depress reset button on overspeed switch (para 2-7*b* (4)).
n. Other causes.	*n.* Refer other causes to direct support level maintenance personnel.

Page 3-22. Table 3-2, Item 6, add the following:

Probable cause	*Corrective action*
f. 1 Engine overspeeds (safety switch shutoff).	*f.* 1 Depress reset button on over speed switch before starting (para 2-7*b* (4)).

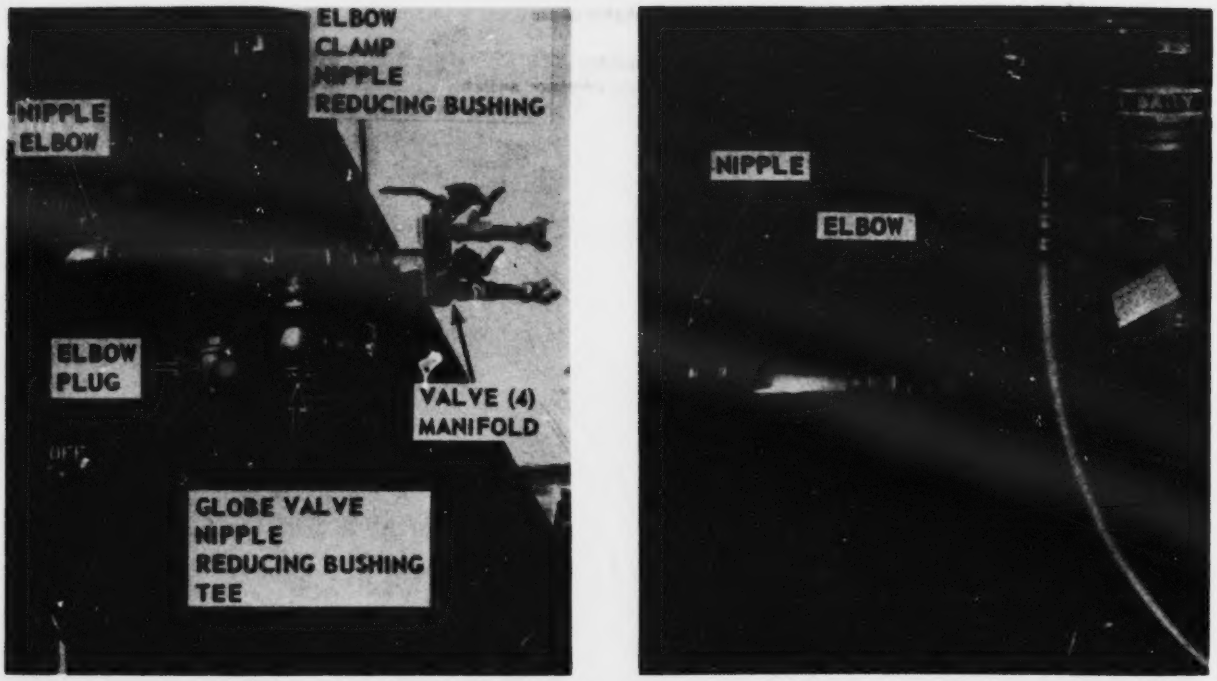
Page 3-25. Table 3-2, after Item 28 add the following:

Malfunction	*Probable cause*	*Corrective action*
28.1 Fuel pressure switch needle flutters.	*a.* Defective snubber. *b.* Defective fuel pressure switch.	*a.* Replace snubber. Paragraph 3-52. *b.* Replace fuel pressure switch. Paragraph 3-52.

Page 3-27. Table 3-2, Item 38 add the following:

Probable cause	*Corrective action*
c. Brake lining not burnished.	*c.* Burnish parking brake, adjust, and test for proper holding (para 3-129).

Page 3-29. Figure 3-21 (sheet 1 of 2) is superseded as follows:


ELBOW
CLAMP
NIPPLE
REDUCING BUSHING
NIPPLE
ELBOW
ELBOW
PLUG
VALVE (4)
MANIFOLD
GLOBE VALVE
NIPPLE
REDUCING BUSHING
TEE
OFF
NIPPLE
ELBOW

ME 4310-338-15/3-21 ① C1

REMOVAL

STEP 1. REMOVE OIL FILLER PLUG, NIPPLE, AND ELBOWS FROM OIL SEPARATOR.

STEP 2. REMOVE VALVES, MANIFOLD, CLAMP, AND PIPING FROM AIR DISCHARGE CONNECTION.

STEP 3. LOOSEN BOLT AND NUT; REMOVE RAIN SHIELD.

STEP 4. LOOSEN BOLTS AND NUTS; REMOVE AIR CLEANER CAPS.

INSTALLATION

STEP 1. INSTALL AIR CLEANER CAPS AND SECURE WITH BOLTS AND NUTS.

STEP 2. INSTALL RAIN SHIELD AND SECURE WITH BOLT AND NUT.

STEP 3. INSTALL PIPING, MANIFOLD CLAMP, AND VALVES TO AIR DISCHARGE CONNECTION.

STEP 4. INSTALL OIL FILLER ELBOWS, NIPPLE, AND PLUG TO OIL SEPARATOR.

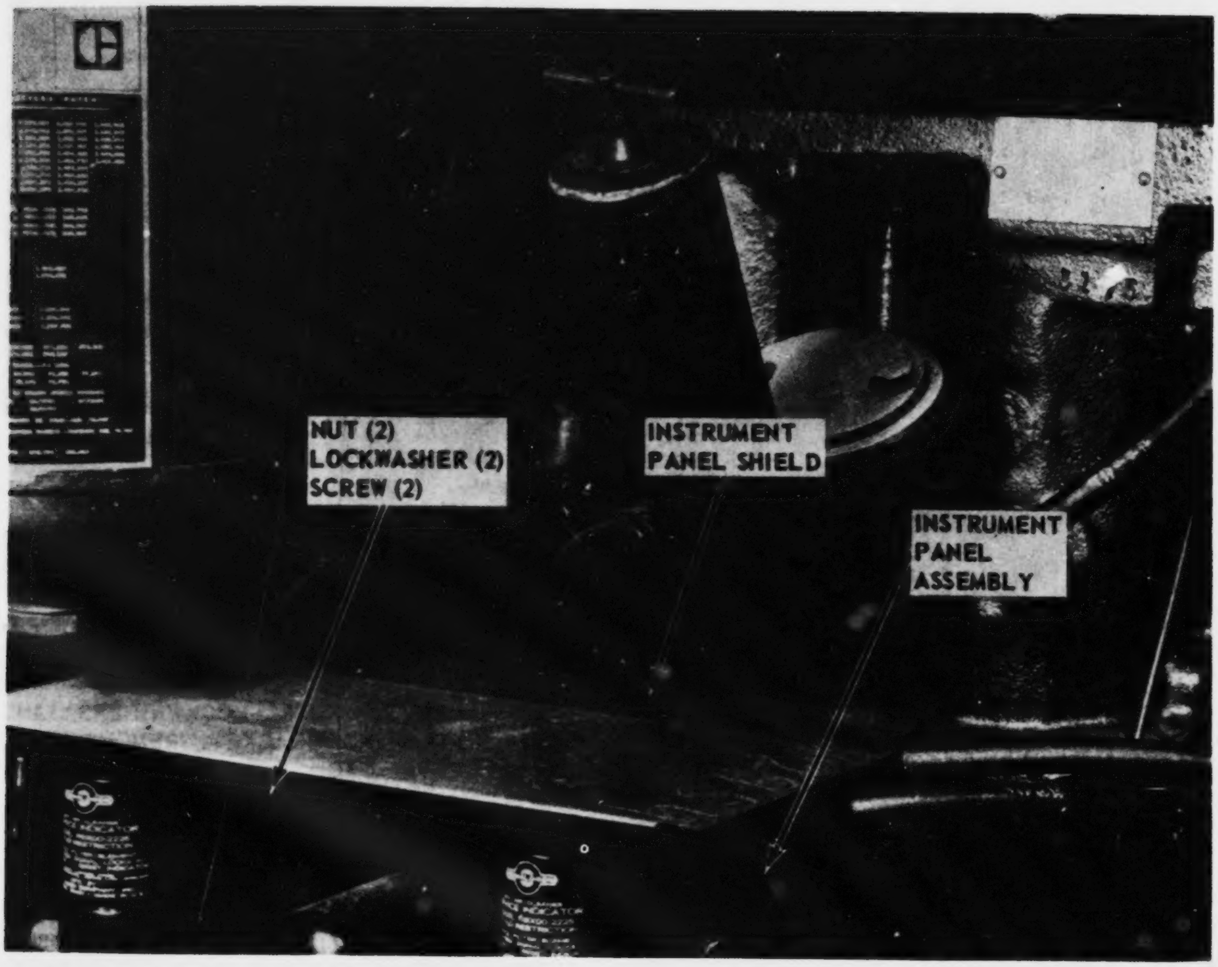
Figure 3-21. Removal and installation of external components on housing group (sheet 1 of 2).

Page 3-42. Paragraph 3-45 *a* (4) is superseded as follows:

(4) Remove instrument panel shield as shown in figure 3-32.1.

(5) Remove instrument panel assembly as shown in figure 3-33.

Page 3-42. **Figure 3-32.1 is added.**


NUT (2)
LOCKWASHER (2)
SCREW (2)
INSTRUMENT PANEL SHIELD
INSTRUMENT PANEL ASSEMBLY
ME 4310-338-15/3-32.1 C1

REMOVAL

STEP 1. REMOVE NUTS, LOCKWASHERS, AND SCREWS.

STEP 2. REMOVE INSTRUMENT PANEL SHIELD FROM INSTRUMENT PANEL ASSEMBLY.

INSTALLATION

STEP 1. POSITION INSTRUMENT PANEL SHIELD ON TOP OF INSTRUMENT PANEL ASSEMBLY.

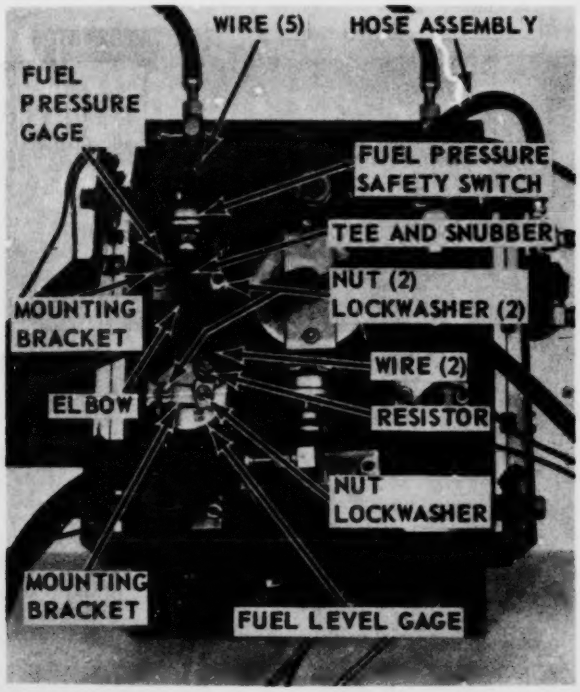
STEP 2. SECURE SHIELD TO INSTRUMENT PANEL ASSEMBLY WITH SCREWS, LOCKWASHERS, AND NUTS.

Figure 3-32.1. Instrument panel shield: removal and installation.

Page 3-43. **Paragraph 3-45 c (5) is added.**

(5) Install instrument panel shield as shown in figure 3-32.1.

Page 3-45. Figure 3-34 (sheet 2 of 8) is superseded as follows:


WIRE (5)
HOSE ASSEMBLY
FUEL PRESSURE GAGE
FUEL PRESSURE SAFETY SWITCH
TEE AND SNUBBER
NUT (2)
LOCKWASHER (2)
MOUNTING BRACKET
WIRE (2)
ELBOW
RESISTOR
NUT
LOCKWASHER
MOUNTING BRACKET
FUEL LEVEL GAGE

REMOVAL

STEP 1. DISCONNECT HOSE ASSEMBLY AND WIRES.

STEP 2. REMOVE SWITCH, ELBOW, TEE, AND SNUBBER.

STEP 3. REMOVE NUTS, LOCKWASHERS, AND MOUNTING BRACKET. REMOVE FUEL PRESSURE GAGE.

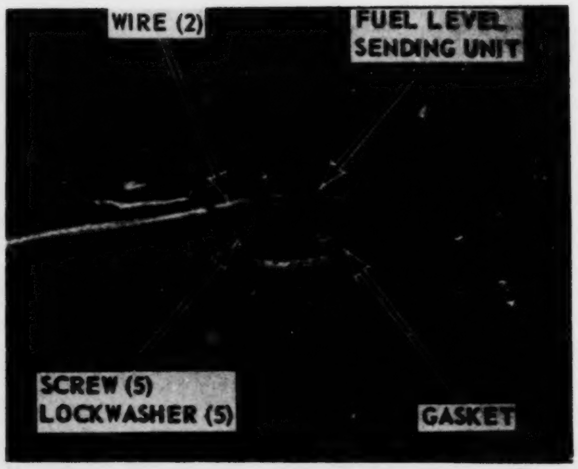
INSTALLATION

STEP 1. PLACE FUEL PRESSURE GAGE ON INSTRUMENT PANEL AND INSTALL MOUNTING BRACKET. SECURE WITH NUTS AND LOCKWASHERS.

STEP 2. INSTALL SNUBBER, TEE, ELBOW, AND SWITCH.

STEP 3. CONNECT HOSE ASSEMBLY AND WIRES (SEE FIGURE 1-3 FOR WIRING DIAGRAM).

C **FUEL PRESSURE GAGE; REMOVAL AND INSTALLATION.**


WIRE (2)
FUEL LEVEL SENDING UNIT
SCREW (5)
LOCKWASHER (5)
GASKET

ME 4310-338-15/3-34②C1

REMOVAL

STEP 1. DISCONNECT WIRES FROM GAGE AND SENDING UNIT.

STEP 2. REMOVE NUT, LOCKWASHER, AND RESISTOR FROM GAGE.

STEP 3. REMOVE NUTS, LOCKWASHERS, AND MOUNTING BRACKET. REMOVE FUEL LEVEL GAGE.

STEP 4. REMOVE SCREWS AND LOCKWASHERS. REMOVE SENDING UNIT AND GASKET.

INSTALLATION

STEP 1. INSTALL SENDING UNIT AND GASKET. SECURE WITH SCREWS AND LOCKWASHERS. CONNECT WIRES (SEE FIGURE 1-3 FOR WIRING DIAGRAM.

STEP 2. PLACE FUEL LEVEL GAGE ON INSTRUMENT PANEL AND INSTALL MOUNTING BRACKET. SECURE WITH NUTS AND LOCKWASHERS.

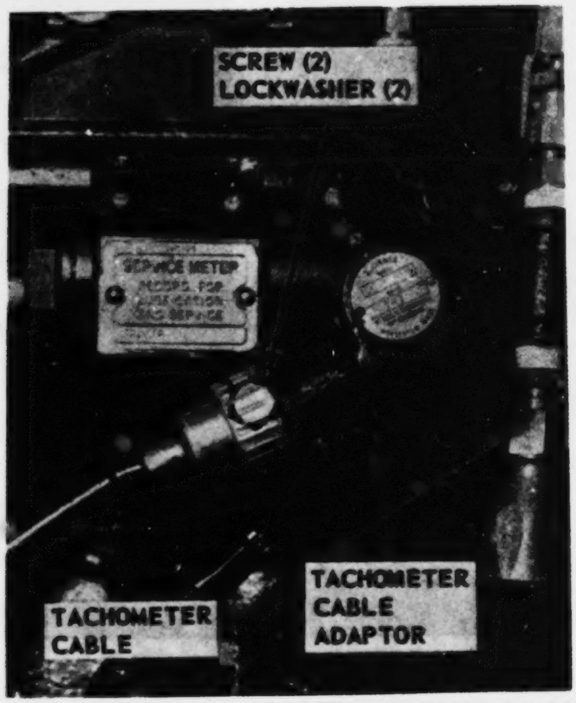
STEP 3. INSTALL RESISTOR ON REAR OF GAGE AND SECURE WITH NUT AND LOCKWASHER.

STEP 4. CONNECT WIRES TO GAGE (SEE FIGURE 1-3).

D **FUEL LEVEL GAGE; REMOVAL AND INSTALLATION.**

Figure 3-34. Instrument panel controls and instruments, removal and installation (sheet 2 of 8).

Page 3-54. Figure 3-36 is superseded as follows:


SCREW (2)
LOCKWASHER (2)
TACHOMETER CABLE ADAPTOR
TACHOMETER CABLE

ME 4310-338-15/3-36 C1

REMOVAL

STEP 1. DISCONNECT TACHOMETER CABLE.

STEP 2. REMOVE TACHOMETER CABLE ADAPTOR.

STEP 3. REMOVE SCREWS AND LOCKWASHERS. REMOVE SERVICE METER.

INSTALLATION

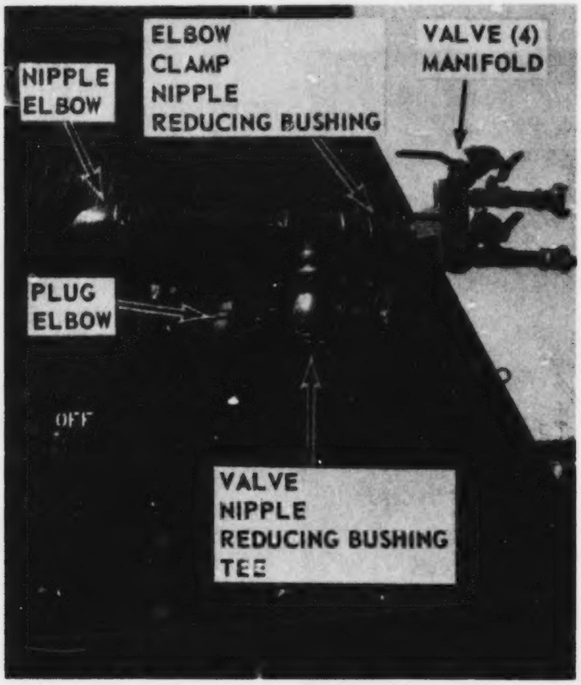
STEP 1. POSITION SERVICE METER AND SECURE WITH SCREWS AND LOCKWASHERS.

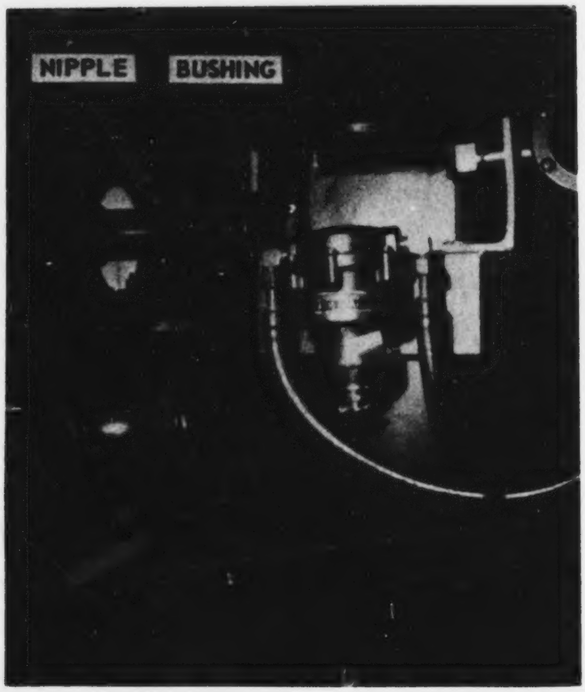
STEP 2. INSTALL TACHOMETER CABLE ADAPTOR.

STEP 3. INSTALL TACHOMETER CABLE.

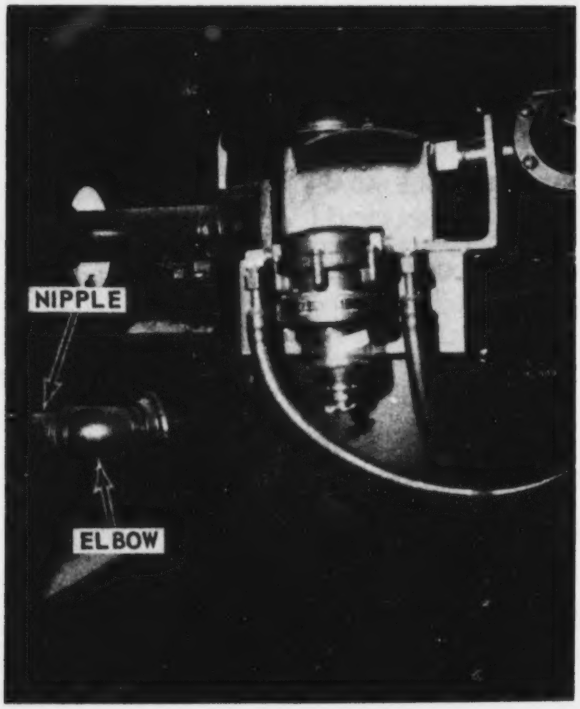
Figure 3-36. Service meter: removal and installation

Page 3-72. Figure 3-58 (sheet 1 of 2) is superseded as follows:


NIPPLE
ELBOW
ELBOW
CLAMP
NIPPLE
REDUCING BUSHING
VALVE (4)
MANIFOLD
PLUG
ELBOW
OFF
VALVE
NIPPLE
REDUCING BUSHING
TEE


NIPPLE
BUSHING

ME 4310-338-15/3-58 ① C1


NIPPLE
ELBOW

REMOVAL

STEP 1. REMOVE OIL FILLER PLUG, NIPPLE, AND ELBOWS FROM OIL SEPARATOR.

STEP 2. REMOVE VALVES, MANIFOLD, CLAMP, AND PIPING FROM AIR DISCHARGE CONNECTION.

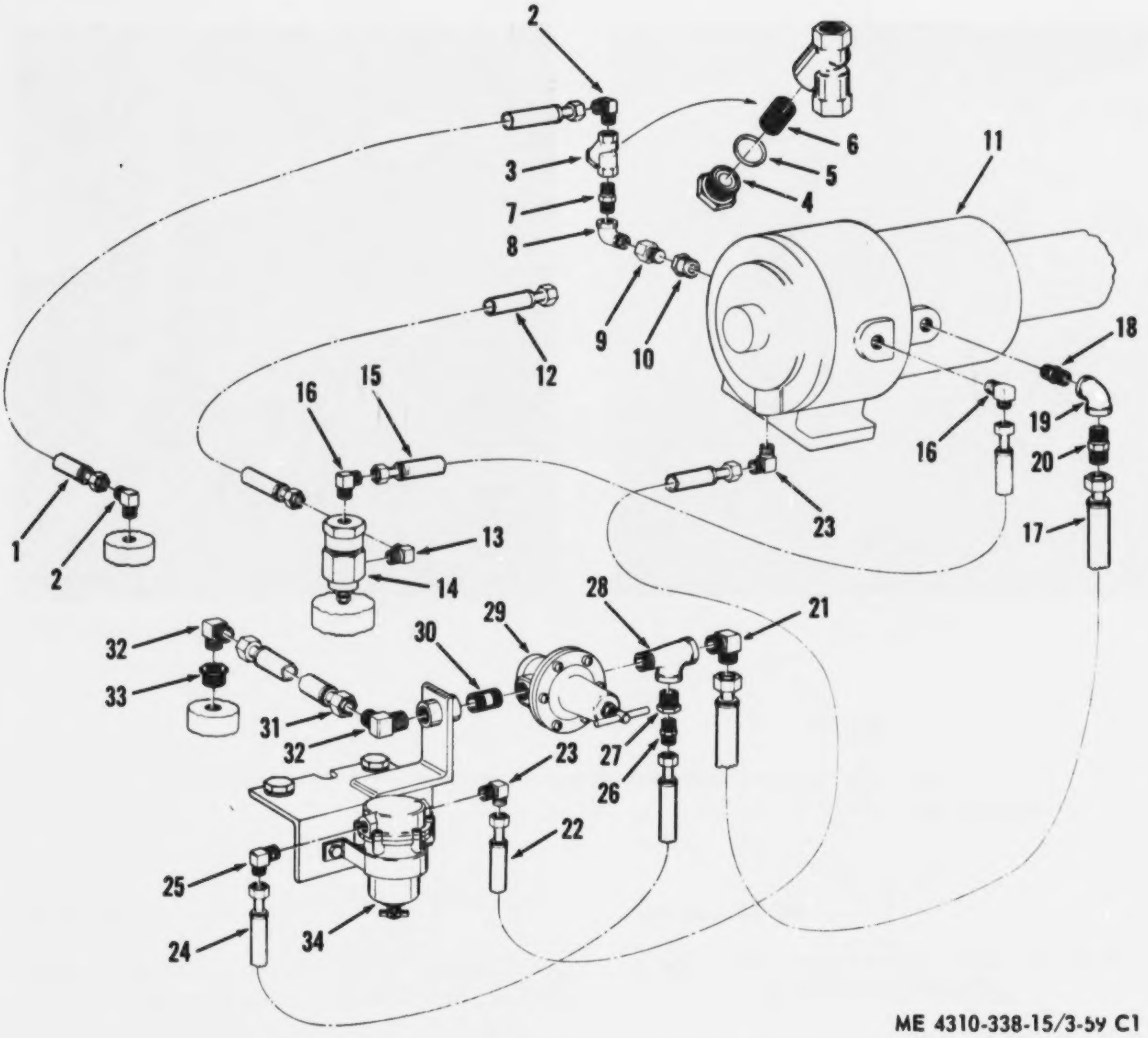
INSTALLATION

STEP 1. INSTALL PIPING, CLAMP, MANIFOLD AND VALVES TO AIR DISCHARGE CONNECTION.

STEP 2. INSTALL OIL FILLER ELBOWS, NIPPLE, AND PLUG TO OIL SEPARATOR.

Figure 3-58. Air discharge connections, service valves, and piping, removal and installation. (sheet 1 of 2).

Page 3-74. Figure 3-59 is superseded as follows: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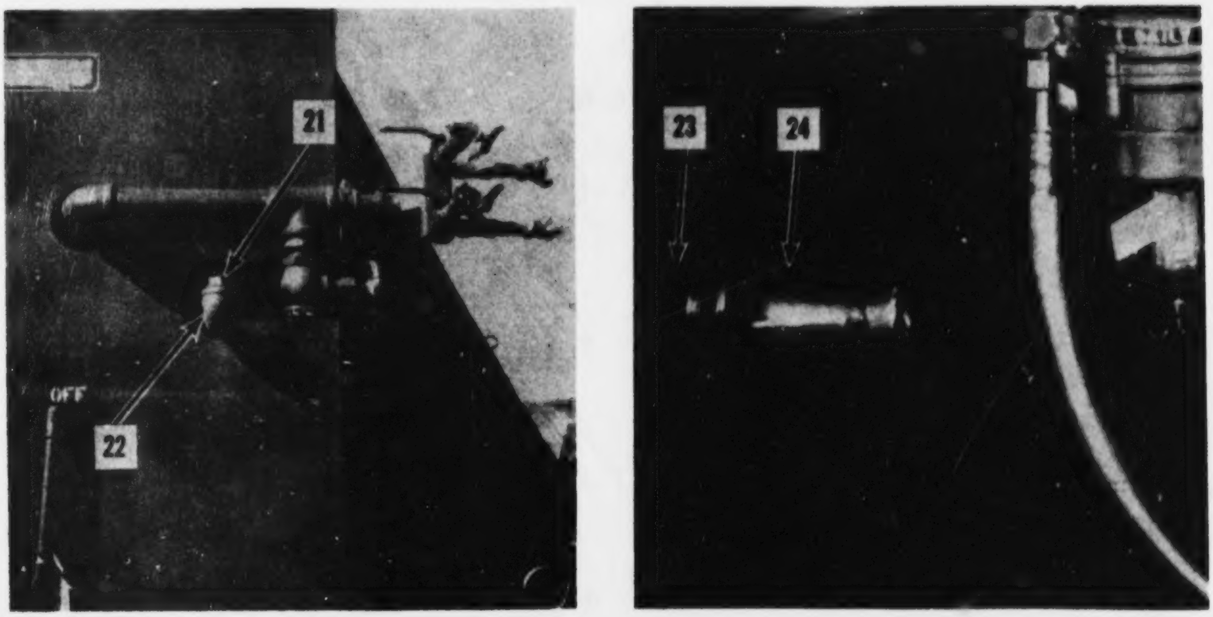
34
ME 4310-338-15/3-59 C1

1. Hose assembly
2. Elbow (2)
3. Strainer
4. Plug
5. O-Ring
6. Element
7. Connector
8. Elbow
9. Restricted adapter
10. Reducing bushing
11. Compressor intake-control
12. Hose assembly
13. Elbow
14. Blowdown valve assembly
15. Hose assembly
16. Elbow (2)
17. Hose assembly
18. Connector
19. Elbow
20. Connector
21. Elbow
22. Hose assembly
23. Elbow (2)
24. Hose assembly
25. Elbow
26. Connector
27. Reducing bushing
28. Tee
29. Air pressure regulator
30. Nipple
31. Hose assembly
32. Elbow (2)
33. Reducing bushing
34. Moisture separator

Figure 3-59. Air hoses, strainer, and fittings: removal and installation.

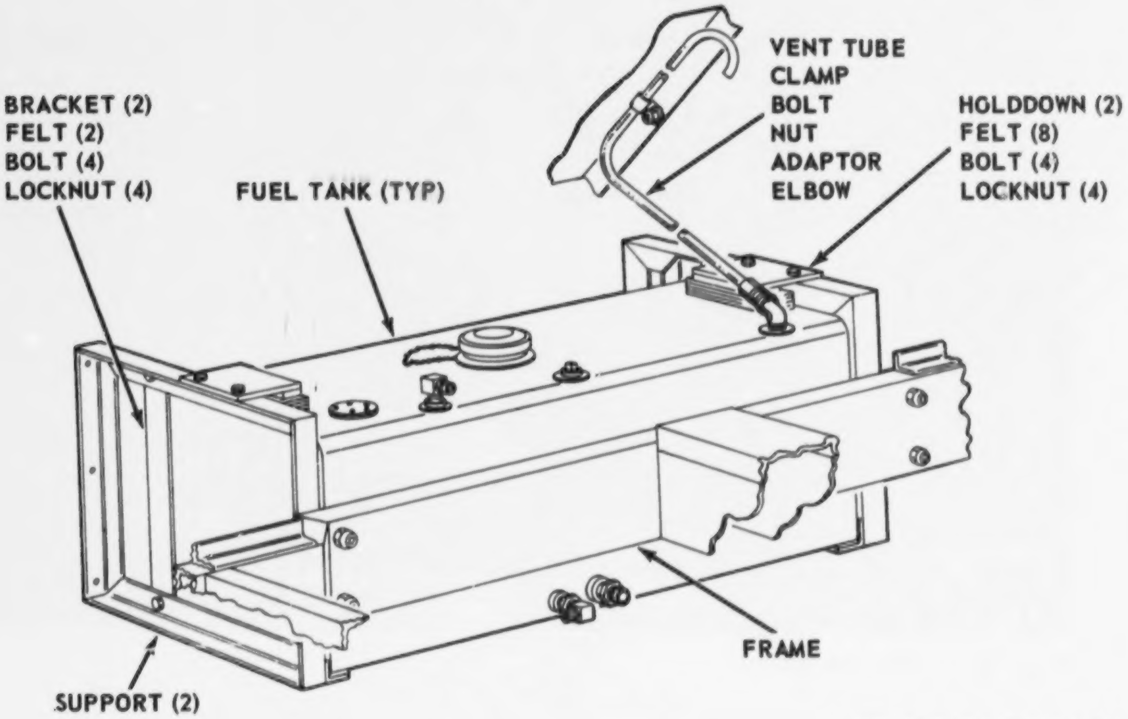
Page 3-81. Figure 3-65 (sheet 3 of 3) is superseded as follows:



ME 4310-338-15/3-65 ③ C1

Figure 3-65. Compressor oil lines and fittings; removal and installation. (sheet 3 of 3)

Page 3-90. Figure 3-74 is superseded as follows:


BRACKET (2)
FELT (2)
BOLT (4)
LOCKNUT (4)
FUEL TANK (TYP)
VENT TUBE
CLAMP
BOLT
NUT
ADAPTOR
ELBOW
HOLDDOWN (2)
FELT (8)
BOLT (4)
LOCKNUT (4)
FRAME
SUPPORT (2)

ME 4310-338-15/3-74 C1

REMOVAL

STEP 1. REMOVE BOLT, NUT, CLAMP, AND TUBE. REMOVE ADAPTOR AND ELBOW.

STEP 2. REMOVE BOLTS AND LOCKNUTS FROM HOLDDOWNS. REMOVE HOLDDOWNS AND FELT.

STEP 3. REMOVE BOLTS AND LOCKNUTS FROM BRACKET. REMOVE BRACKET AND FELT.

STEP 4. LIFT FUEL TANK OFF SUPPORTS.

INSTALLATION

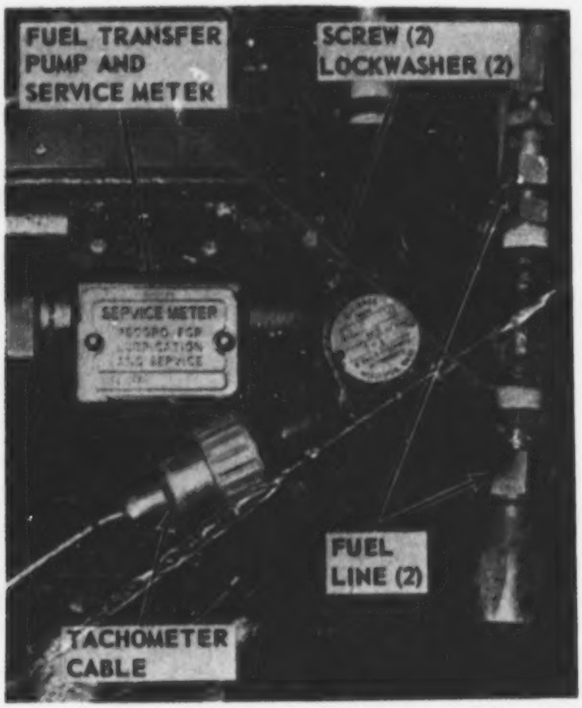
STEP 1. POSITION FUEL TANK IN MOUNTING POSITION ON SUPPORTS.

STEP 2. INSTALL BRACKETS AND FELT AND SECURE WITH BOLTS AND LOCKNUTS.

STEP 3. INSTALL HOLDDOWNS AND FELT AND SECURE WITH BOLTS AND LOCKNUTS.

STEP 4. INSTALL ELBOW, ADAPTOR, AND VENT TUBE. SECURE TUBE WITH CLAMP BOLT, AND NUT.

Page 3-93. Figure 3-80 is superseded as follows:


FUEL TRANSFER PUMP AND SERVICE METER
SCREW (2)
LOCKWASHER (2)
SERVICE METER
FUEL LINE (2)
TACHOMETER CABLE

ME 4310-338-15/3-80C1

REMOVAL

STEP 1. REMOVE FUEL LINES.

STEP 2. DISCONNECT TACHOMETER CABLE.

STEP 3. REMOVE SCREWS AND LOCKWASHERS. REMOVE FUEL TRANSFER PUMP AND GASKET.

INSTALLATION

STEP 1. POSITION FUEL TRANSFER PUMP AND GASKET. INSTALL SCREWS AND LOCKWASHERS.

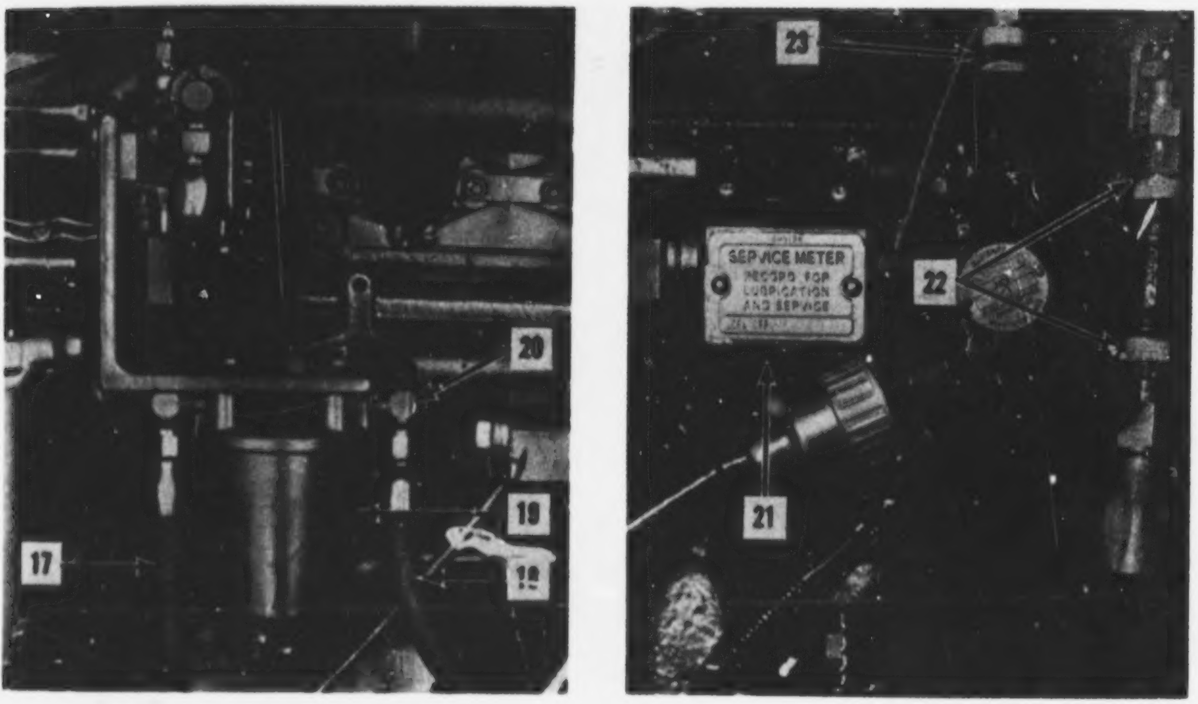
STEP 2. INSTALL FUEL LINES.

STEP 3. CONNECT TACHOMETER CABLE.

Figure 3-80. Fuel transfer pump; removal and installation.

Figure 3-80. Fuel transfer pump: removal and installation.

Page 3-101. **Figure 3-88 (sheet 3 of 4) is superseded as follows:**


20
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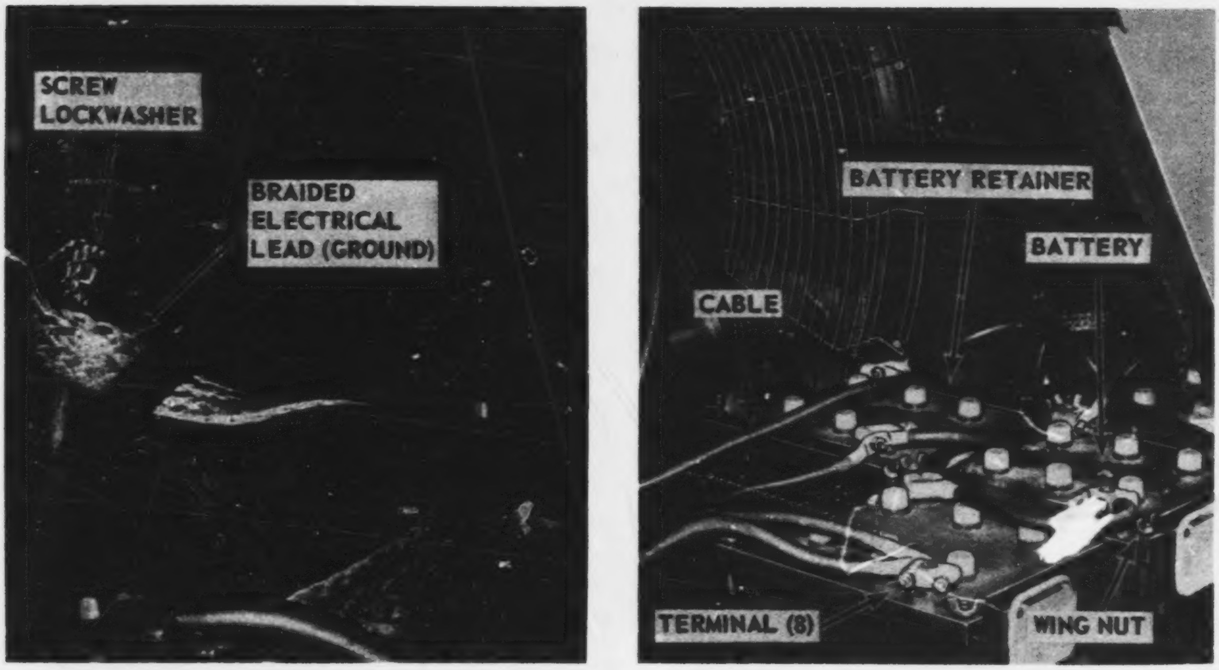
23
SERVICE METER
RECORD FOR
LUBRICATION
AND SERVICE
22
21

ME 4310-338-15/3-88 ③ C1

Figure 3-88. Fuel lines and fittings: removal and installation.

Page 3-108. Figure 3-93 (sheet 1 of 2) is superseded as follows:



ME 4310-338-15/3-93 ① C1

REMOVAL

STEP 1. DISCONNECT GROUND CABLE (BRAIDED ELECTRICAL LEAD) FROM BATTERY POST.

STEP 2. REMOVE SCREW AND LOCKWASHERS FROM BRAIDED ELECTRICAL LEAD. REMOVE LEAD.

STEP 3. LOOSEN BATTERY TERMINAL BOLTS AND NUTS. REMOVE CABLES AND TERMINALS FROM BATTERIES. REMOVE CABLES FROM TERMINALS.

STEP 4. REMOVE NUTS AND WASHERS FROM STARTING MOTOR. REMOVE CABLES.

STEP 5. REMOVE WING NUTS AND BATTERY RETAINERS. REMOVE BATTERIES.

INSTALLATION

STEP 1. INSTALL BATTERIES ON TRAY. INSTALL BATTERY RETAINERS AND SECURE WITH WING NUTS.

STEP 2. INSTALL CABLES AND TERMINALS ON BATTERY POSTS (SEE FIG. 1-3). SECURE WITH BOLTS AND NUTS.

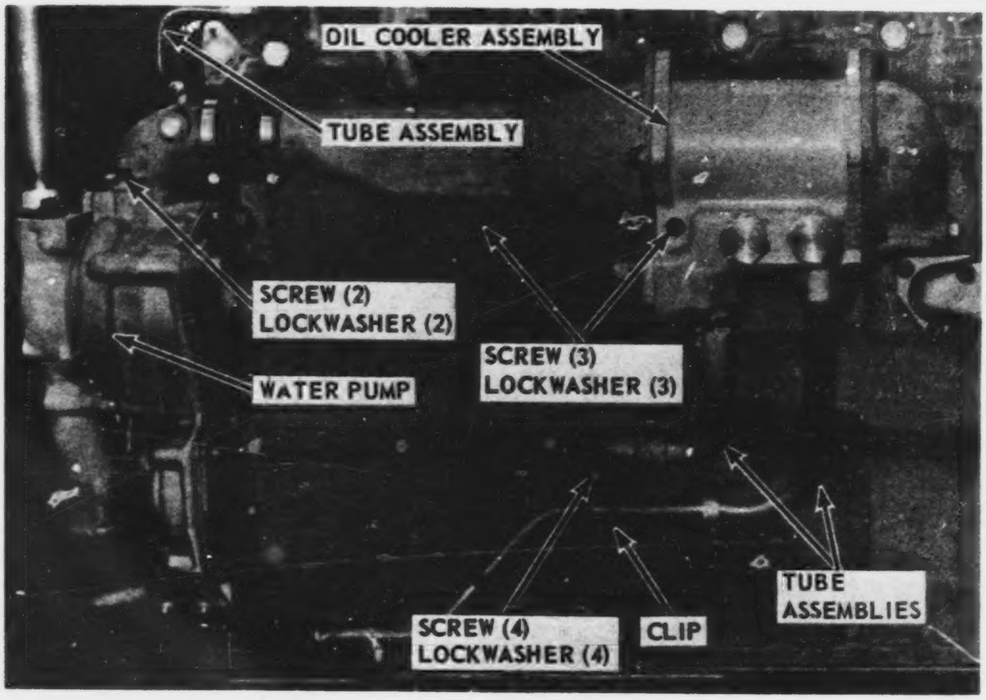
STEP 3. INSTALL CABLES ON STARTING MOTOR AND SECURE WITH NUTS AND WASHERS.

STEP 4. SECURE BRAIDED ELECTRICAL LEAD AND BATTERY CHARGING RECEPTACLE LEAD TO GROUND USING SCREW AND LOCKWASHERS.

STEP 5. CONNECT GROUND CABLE (BRAIDED ELECTRICAL LEAD) TO BATTERY POST (SEE FIG. 1-3).

Figure 3-93. Batteries and cables; removal and installation (sheet 1 of 2).

Page 3-111. Figure 3-95 is superseded as follows:


OIL COOLER ASSEMBLY
TUBE ASSEMBLY
SCREW (2)
LOCKWASHER (2)
WATER PUMP
SCREW (3)
LOCKWASHER (3)
TUBE ASSEMBLIES
SCREW (4)
LOCKWASHER (4)
CLIP

ME4310-338-15/3-95 C1

REMOVAL

STEP 1. REMOVE TUBE ASSEMBLY FROM ELBOW AND ENGINE.

STEP 2. REMOVE SCREWS AND LOCKWASHERS SECURING ELBOW TO WATER PUMP.

STEP 3. REMOVE SCREWS AND LOCKWASHERS SECURING TUBE ASSEMBLIES TO ENGINE. REMOVE CLIP.

STEP 4. REMOVE SCREWS AND LOCKWASHERS SECURING OIL COOLER TO ENGINE. REMOVE OIL COOLER.

INSTALLATION

STEP 1. PLACE OIL COOLER IN MOUNTING POSITION AND SECURE WITH SCREWS AND LOCKWASHERS.

STEP 2. INSTALL CLIP. SECURE TUBE ASSEMBLIES USING SCREWS AND LOCKWASHERS.

STEP 3. SECURE ELBOW TO WATER PUMP USING SCREWS AND LOCKWASHERS.

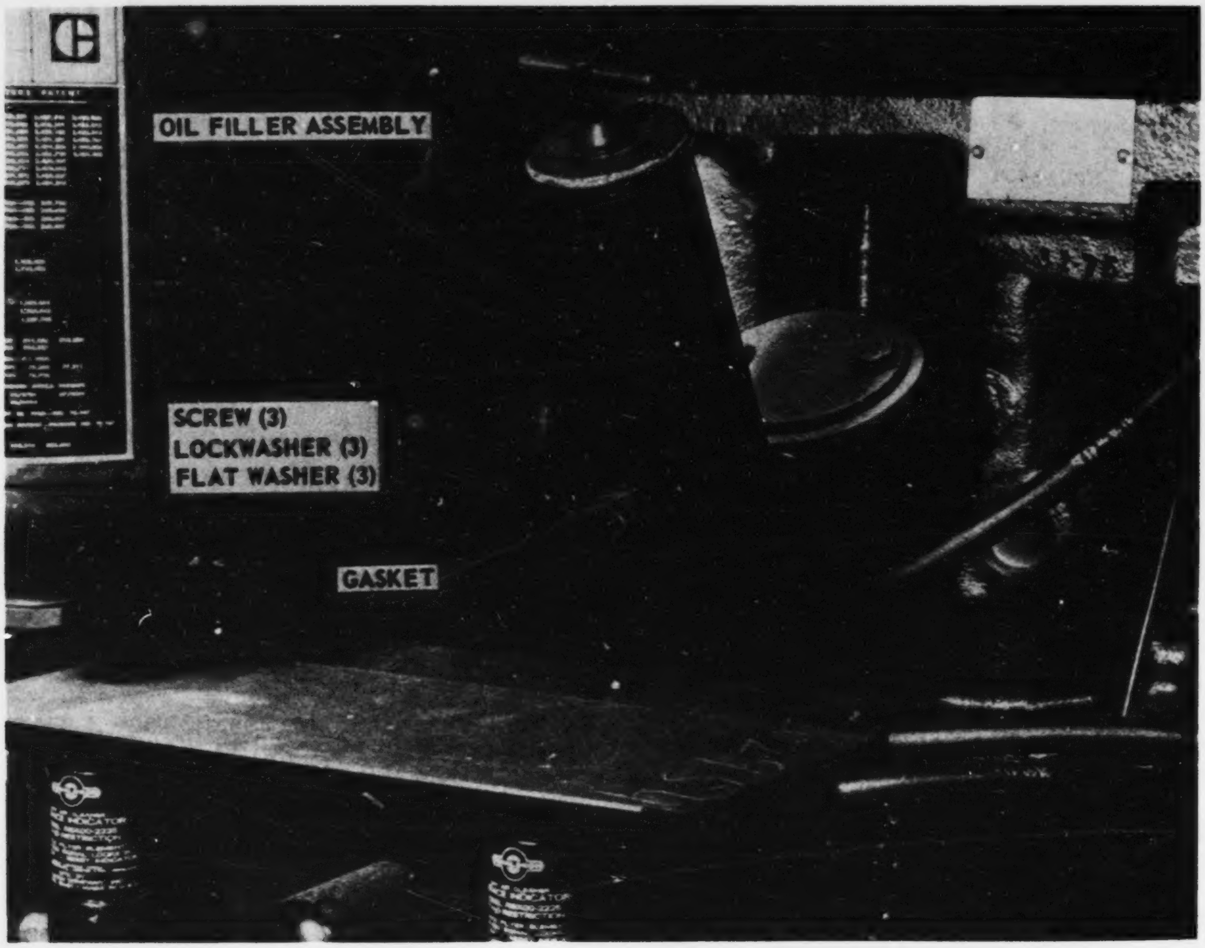
STEP 4. INSTALL TUBE ASSEMBLY.

Figure 3-95. Engine oil cooler assembly: removal and installation.

Page 3-112. Paragraph 3-110 is superseded as follows:

3-110. Oil Filler Assembly.

a. Removal. Remove oil filler assembly as shown in figure 3-96. Figure 3-96 is superseded as follows:



ME 4310-338-15/3-96 C1

REMOVAL

STEP 1. REMOVE SCREWS, LOCKWASHERS, AND FLAT WASHERS FROM ASSEMBLY. REMOVE OIL FILLER ASSEMBLY. REMOVE GASKET.

INSTALLATION

STEP 1. INSTALL NEW GASKET. PLACE OIL FILLER ASSEMBLY IN MOUNTING POSITION. SECURE WITH FLAT WASHERS, LOCKWASHERS, AND SCREWS.

Figure 3-96. Oil filler assembly: removal and installation.

Page 3-113. Paragraphs 3-110 *b*, 3-110 *c*, and 3-110 *d*, superseded as follows:

b. Disassembly. Disassemble oil filler assembly in numerical sequence as shown in figure 3-97.

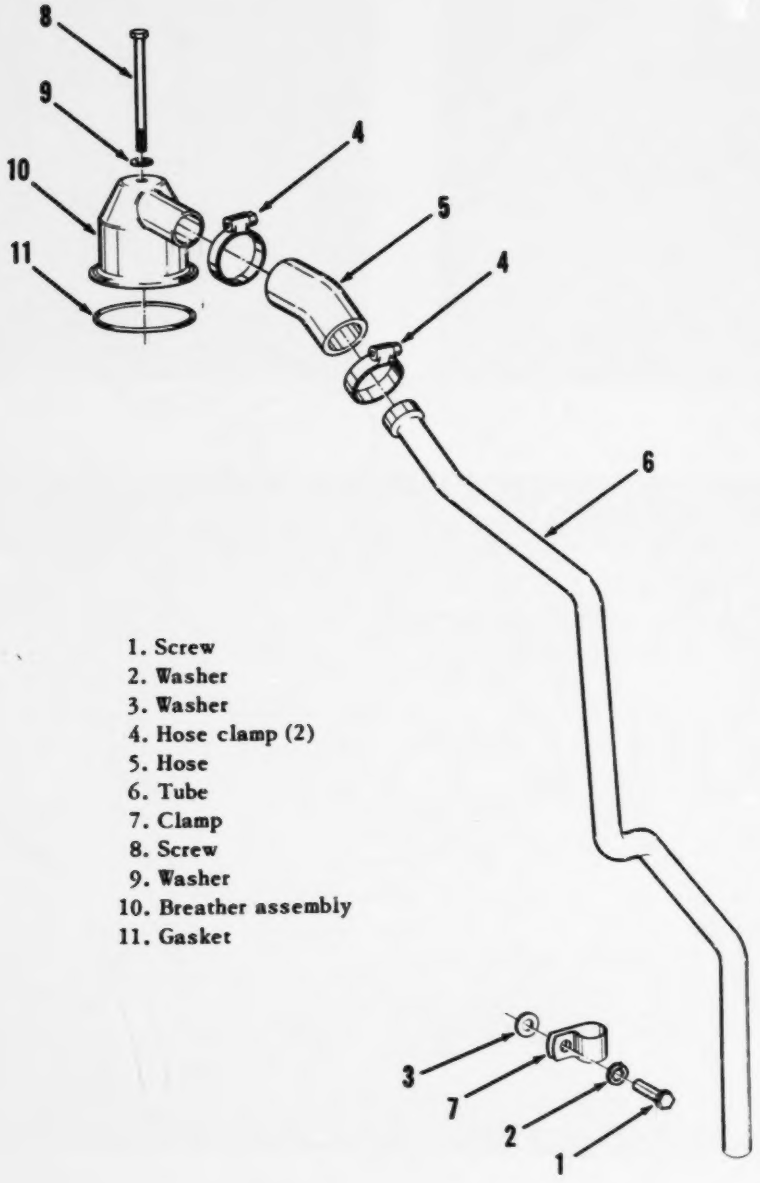
c. Cleaning and Inspection.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect all parts for cracks, breaks, distortion, or any other defect.

d. Reassembly. Reassemble oil filler assembly in reverse numerical sequence as shown in figure 3-97.

Figure 3-97 is superseded as follows:



1. Screw
2. Washer
3. Washer
4. Hose clamp (2)
5. Hose
6. Tube
7. Clamp
8. Screw
9. Washer
10. Breather assembly
11. Gasket

ME 4310-338-15/3-97.1 C1

Figure 3-97. Oil filler assembly: disassembly and reassembly.

Page 3-114. **Paragraph 3-110.1. is added as follows:**

3-110.1. Engine Breather Assembly

a. Removal. Remove breather assembly as shown in figure 3-97.1.

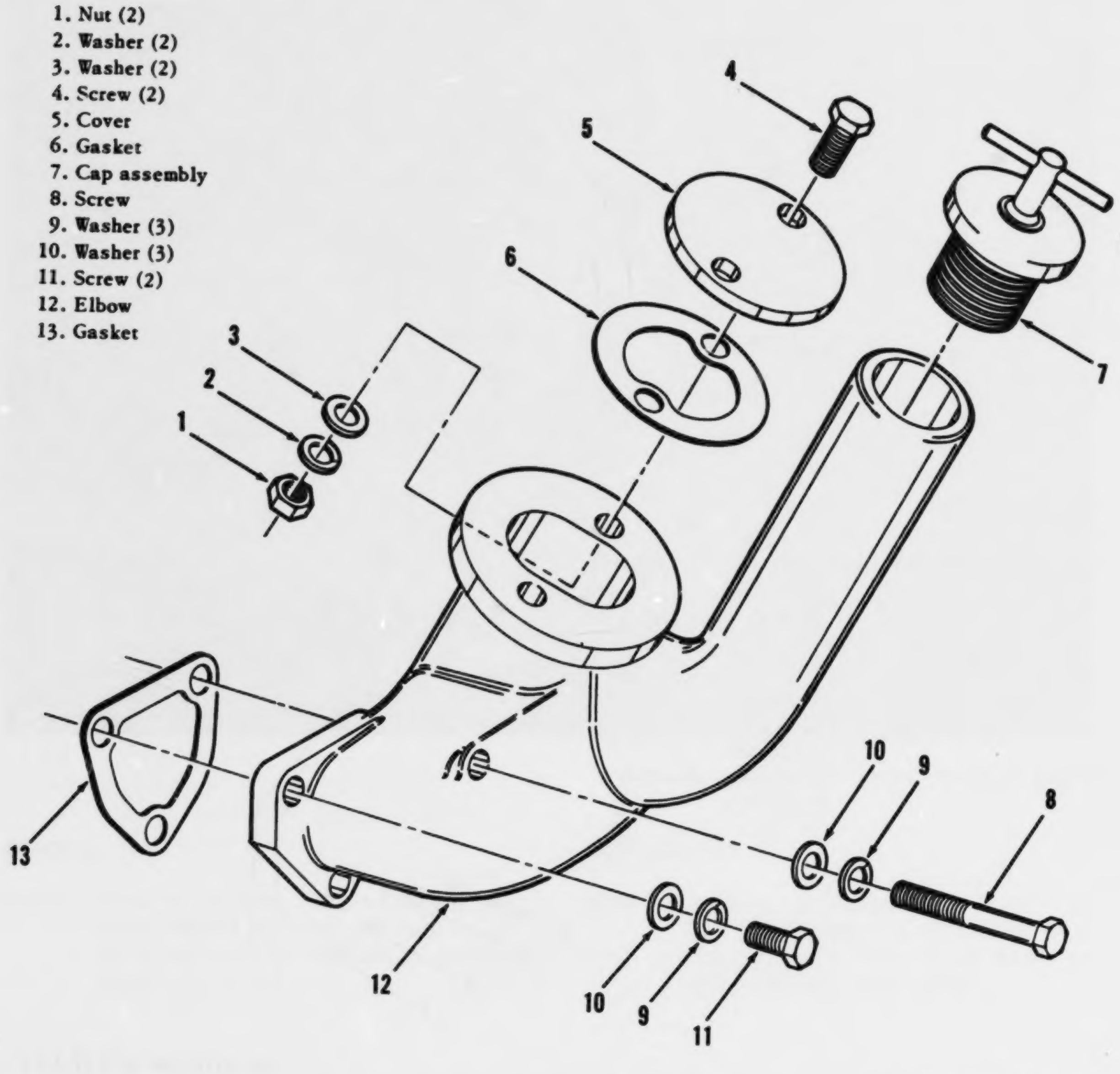
b. Cleaning and Inspection.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect parts for cracks, breaks, distortion, or any other defect.

c. Installation. Install breather assembly as shown in figure 3-97.1.

Figure 3-97.1 is added as follows:



1. Nut (2)
2. Washer (2)
3. Washer (2)
4. Screw (2)
5. Cover
6. Gasket
7. Cap assembly
8. Screw
9. Washer (3)
10. Washer (3)
11. Screw (2)
12. Elbow
13. Gasket

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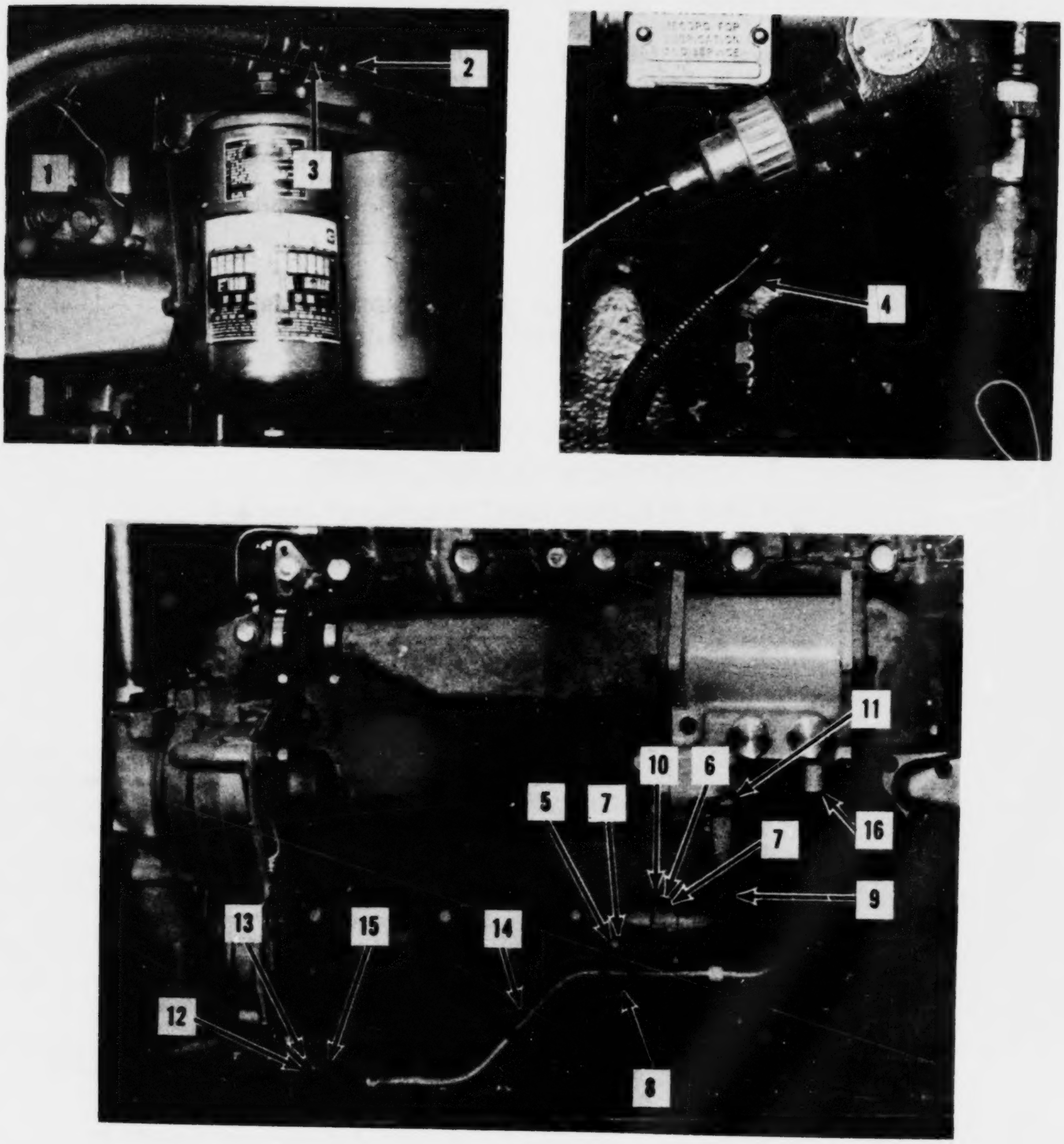
Figure 3-97.1. Engine breather assembly; removal and installation.

Figure 3-98 (sheet 1 of 2) is superseded as follows: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ME 4310-338-15/3-98 ① C1

Figure 3-98. Engine oil lines and fittings: removal and installation. (sheet 1 of 2).

Page 3-120. Paragraph 3-116*a* is superseded as follows:

a. Removal.

(1) Remove turbocharger assembly (para 3-115).

(2) Remove breather assembly (para 3-110.1).

(3) Remove valve cover by following numerical sequence as shown in figure 3-102. Discard gasket.

Page 3-121. Paragraph 3-116*c* is superseded as follows:

c. Installation.

(1) Install valve cover by following reverse numerical sequence as shown in figure 3-102. Install a new gasket.

(2) Install breather assembly (para 3-110.1).

(3) Install turbocharger assembly (para 3-115).

Page 3-135. Paragraph 3-129*c*, add the following:

WARNING

Brake lining on new equipment or new installed linings shall be burnished and adjusted, then tested to see if parking brake will hold the unit from moving on down-hill grades.

Page 3-136. Paragraph 3-131*c*(1) add the following sentence:

Refer to Table 1-3 for spring mounting torque data.

Page 5-22. Table 5-6, Item 2, add the following:

Probable cause	*Corrective action*
j. Engine overspeed governor switch activated.	*j.* Depress reset button on overspeed switch.

TECHNICAL MANUAL
NO. 5-4310-338-15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *16 October 1970*

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL

COMPRESSOR, ROTARY, AIR, DIESEL ENGINE DRIVEN, TRAILER MOUNTED,
4-Wheel Pneumatic Tired, 600 CFM, 100 PS1
(Davey Model 1M600RPV)
FSN 4310-136-4369

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CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual contains information for installing, operating, and maintaining the Model 1M600RPV Rotary Air Compressor. Also included are physical and functional descriptions of each major assembly.

b. Chapter 1 is the introduction and contains a brief description of the unit, tabulated data, and other general information. Chapters 2 and 3 contain installation, operating, and organizational maintenance instructions. Chapter 4 contains shipping, limited storage, and demolition information. Chapter 5 contains Direct Support, General Support, and Depot maintenance instructions. Chapters 6 through 8 contain repair instructions authorized by the Maintenance Allocation Chart (MAC).

c. The appendices contain documentation references, a list of basic issue items, and the Maintenance Allocation Chart (MAC). In addition, an index is supplied to assist in locating specific data throughout the manual.

1-2. Forms and Records

a. DA forms and records used for equipment maintenance will be only those prescribed in TM 38-750, Army Equipment Record Procedures.

b. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commanding General, U. S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

Section II. DESCRIPTION AND DATA

1-3. Description

The air compressor unit is a trailer mounted, four-wheel pneumatic tired, diesel engine driven, sliding blade type, rotary air compressor. The unit supplies 600 cubic feet of air per minute (CFM) at a discharge pressure of 100 pounds per square inch (PSI). This equipment is manufactured by the Davey Compressor Company, Kent, Ohio, as their Model 1M600RPV, Part Number 61438 (fig. 1-1 and 1-2). The compressor unit is enclosed in a sheet metal housing fastened to a frame and axle combination. The unit has an air brake system operated from the towing vehicle. When the unit is parked, the brakes are set manually using a hand lever provided. The compressor unit is self contained and capable of continuous operation, under normal conditions, for a period of eight hours without refueling. The unit is employed for general construction work in conjunction with pneumatic tools and other equipment.

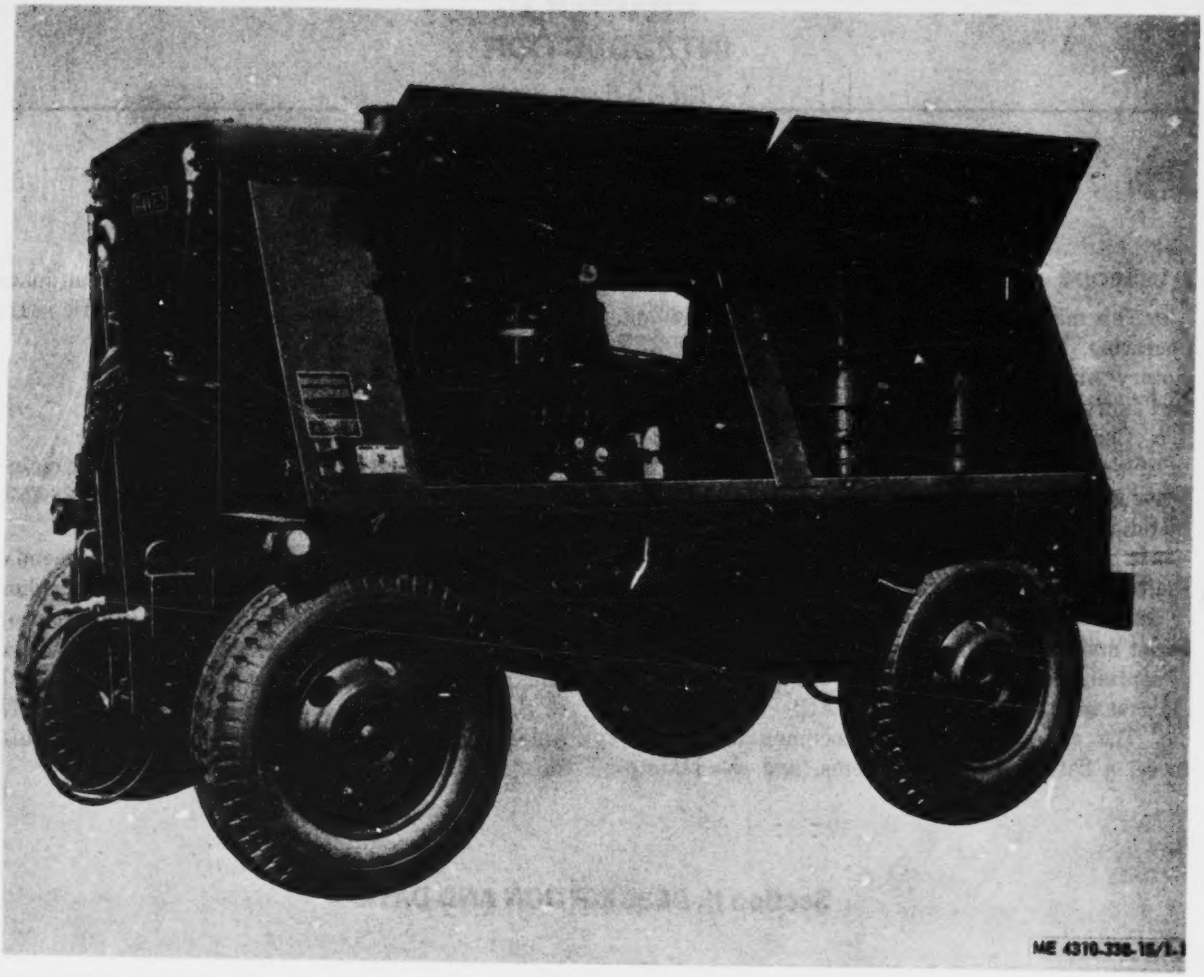
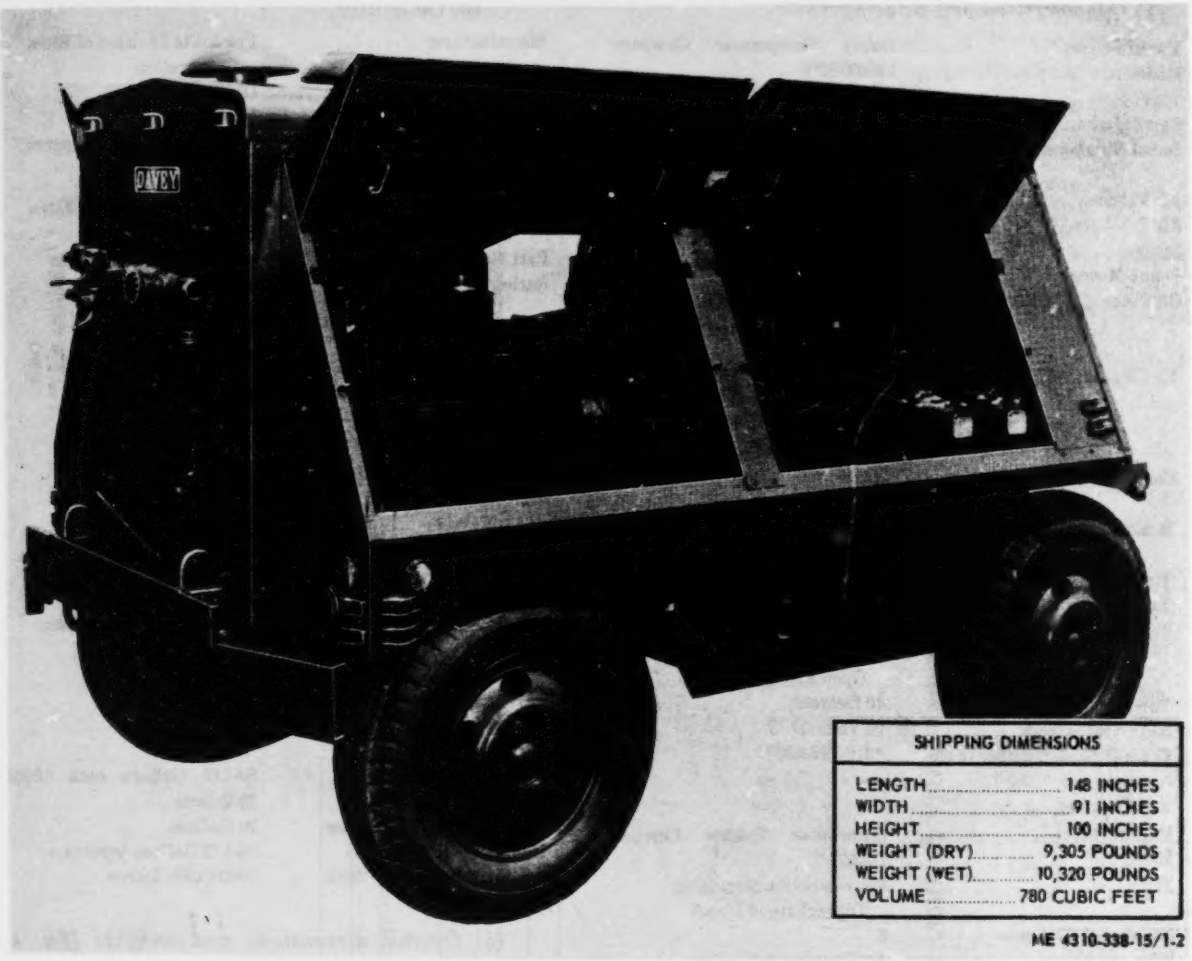

ME 4310-338-15/1-1

Figure 1-1. Model 1M600RPV Rotary Air Compressor, left front, three-quarter view.



SHIPPING DIMENSIONS

LENGTH	148 INCHES
WIDTH	91 INCHES
HEIGHT	100 INCHES
WEIGHT (DRY)	9,305 POUNDS
WEIGHT (WET)	10,320 POUNDS
VOLUME	780 CUBIC FEET

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Figure 1-2. Model 1M600RPV Rotary Air Compressor, right rear, three-quarter view.

1-4. Identification and Tabulated Data

a. Identification. The air compressor unit has five major identification and data plates. The information contained on these plates is listed below.

(1) *U. S. Army plate.* Located on the left front housing side panel. Specifies nomenclature, stock number, serial numbers, manufacturer, model, contract number, dimensions, capacity, weights, inspection information, and warranty data.

(2) *Transportation data plate.* Located on the left front housing side panel. Illustrates prescribed lifting method, location of lifting and tie-down eyes, and center-of-gravity. Specifies dimensions, shipping weight and cubage, towing speeds, and tire pressure.

(3) *Operating instruction plate.* Located on the left front housing side panel. Specifies how to start, operate, and stop the unit. Also includes lubrication specifications.

(4) *Rotary compressor plate.* Located on the top left side of the compressor stator. Specifies compressor model and serial number.

(5) *Engine data plate.* Located on the left side of the engine flywheel housing. Specifies engine model, number os cylinders, bore and stroke, serial number, fuel rack setting, horsepower, RPM data, and altitude information.

b. Tabulated Data.

(1) *1M600RPV rotary air compressor.*

Manufacturer	Davey Compressor Company
Model	1M600RPV
Type	Sliding Blade, Air, Rotary, DED
Part Number	61438
Serial Numbers	5P408-15349 through 5P408-15385
Air Volume	600 CFM
Air Pressure	100 PSI
Stages	One
Prime Mover	Diesel Engine
Oil Filter	Marvel Engineering Company No. 255241-1500-576366-1110
Air Cleaner	Donaldson Company, Inc., Dry type, Model SBG14-0042 (Element FSN No. 2940-878-0133)
Mounting	Trailer mounted, 4-wheel, pneumatic tires
Brakes	Air actuated wedge type; Mechanical Hand Brake
Tire Size	9:00 x 20
Tire Pressure	45 PSI
Towing Speeds (Max.)	Unpaved Roads; 25 MPH Paved Roads: 35 MPH Open Field: 5 MPH
Turning Angle	40 Degrees
Electrical System	24 Volts, D. C.
Federal Stock Number (FSN)	4310-136-4369

(2) *Engine.*

Manufacturer	Caterpillar Tractor Company
Model	D333C-T
Type	Four-cycle Reciprocating Turbocharged Diesel
Number of Cylinders	6
Bore and Stroke	4.75 Inches x 6.0 Inches
Displacement	638 Cubic Inches
Oil Pressure Normal at 1800 RPM	60—70 PSI
Fuel Pressure at 1800 RPM	25 PSI Minimum
Governed Speed	1800 RPM
Low Idle Speed	1000 RPM
High Idle Speed	2050 RPM
Brake Horsepower without Fan	190@ 1800 RPM
Firing Order	1—5—3—6—2—4
Recommended Fuel Oil	No. 2 (ASTM Spec. No. D396)

(3) *Engine accessories.*

(*a*) *Starting motor.*

Manufacturer	Prestolite Division of Eltra Corporation
Part Number	MFY-6101-BUT
Type	Heavy Duty; Positork Drive
Rating	24 Volts, D. C.

(*b*) *Generator.*

Manufacturer	Prestolite Division of Eltra Corporation
Part Number	GHS-6002-TS
Type	Ventilated
Rated Output	24 Volts, D. C.; 18 Amperes

(*c*) *Generator regulator.*

Manufacturer	Prestolite Division of Eltra Corporation
Part Number	VBU-4002-UT
Rating	24 Volts, D. C.

(*d*) Air Cleaner.

Manufacturer	Donaldson Company, Inc.
Type	Dry
Model Number	SBG14-0042
Element	FSN No. 2940-878-0133

(*e*) *Primary fuel filter.*

Manufacturer	Fram Corporation
Model Number	FBM 1824
Element Number	C 1824

(*f*) *Overspeed governor switch.*

Manufacturer	Pierce Governor Company
Type	Centrifugal
Trip Speed (Engine RPM)	2050+50 RPM
Part Number	GC-11009A-R1

(4) *Capacities.*

Fuel Tanks (2)	59-1/2 Gallons each (Approx.)
Engine Crankcase	29 Quarts
Compressor Oil Separator	26 Gallons
Engine Cooling System	16-1/2 Gallons (approx.)
Air Brake Reservoir Tank	1080 Cubic Inches

(5) *Overall dimensions and weights (fig. 1-2).*

Overall Length (Tow Bar Up)	148 Inches
Overall Length (Tow Bar Down)	206 Inches
Overall Width	91 Inches
Overall Height	100 Inches
Net Weight Empty	9,305 Lbs. Approx.
Net Weight Filled	10,320 Lbs.
Shipping Volume	780 Cubic Feet
Shipping Weight	9,305 Lbs. Approx.

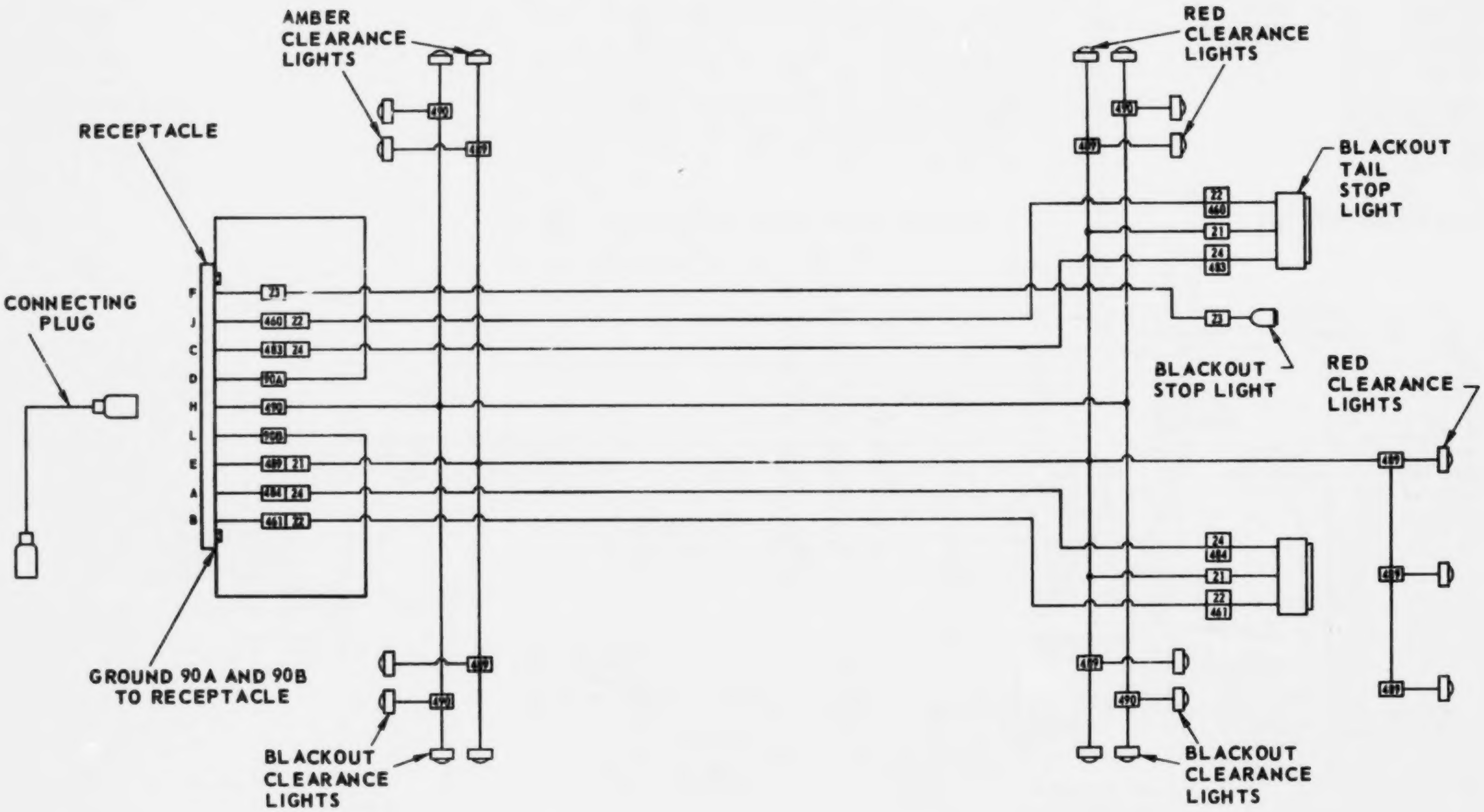
(6) *Adjustment data.* For adjustment data, refer to specific equipment maintenance paragraphs.

(7) *Nut and bolt torque data.*

(*a*) Torque screws, bolts, nuts, and taperlock studs on engine assembly as indicated in table 1-1.

(*b*) Torque screws, bolts, and nuts on compressor assembly as indicated in table 1-2.

(8) *Wiring diagram.* See figure 1-3.


AMBER CLEARANCE LIGHTS
RED CLEARANCE LIGHTS
RECEPTACLE
BLACKOUT TAIL STOP LIGHT
CONNECTING PLUG
F
J
C
D
H
L
E
A
B
23
460 22
483 24
90A
490
90B
489 21
484 24
461 22
BLACKOUT STOP LIGHT
RED CLEARANCE LIGHTS
GROUND 90A AND 90B TO RECEPTACLE
BLACKOUT CLEARANCE LIGHTS
BLACKOUT CLEARANCE LIGHTS

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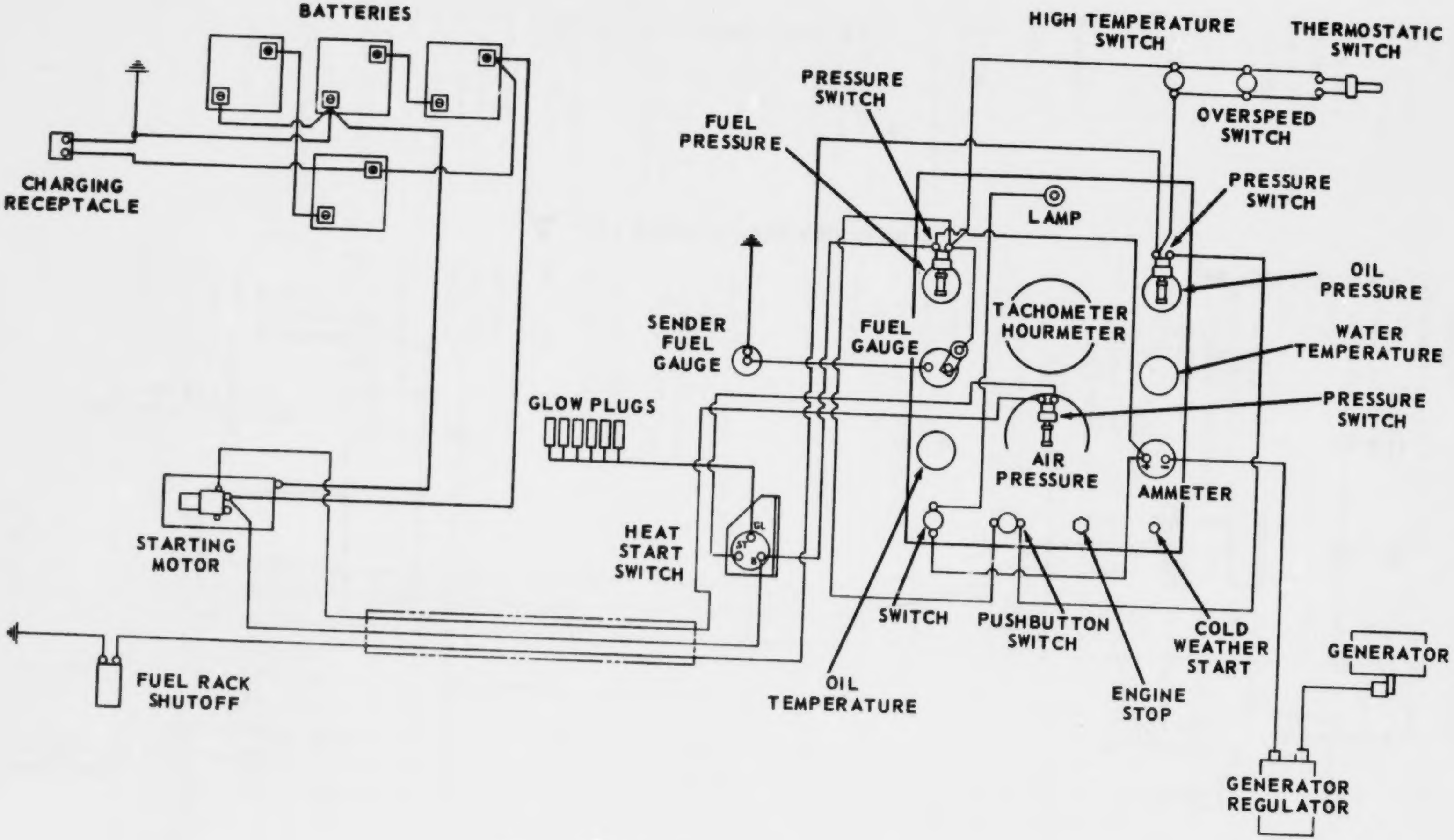
A UNIT LIGHTING WIRING HARNESS

Figure 1-3. Wiring diagram (Sheet 1 of 2).

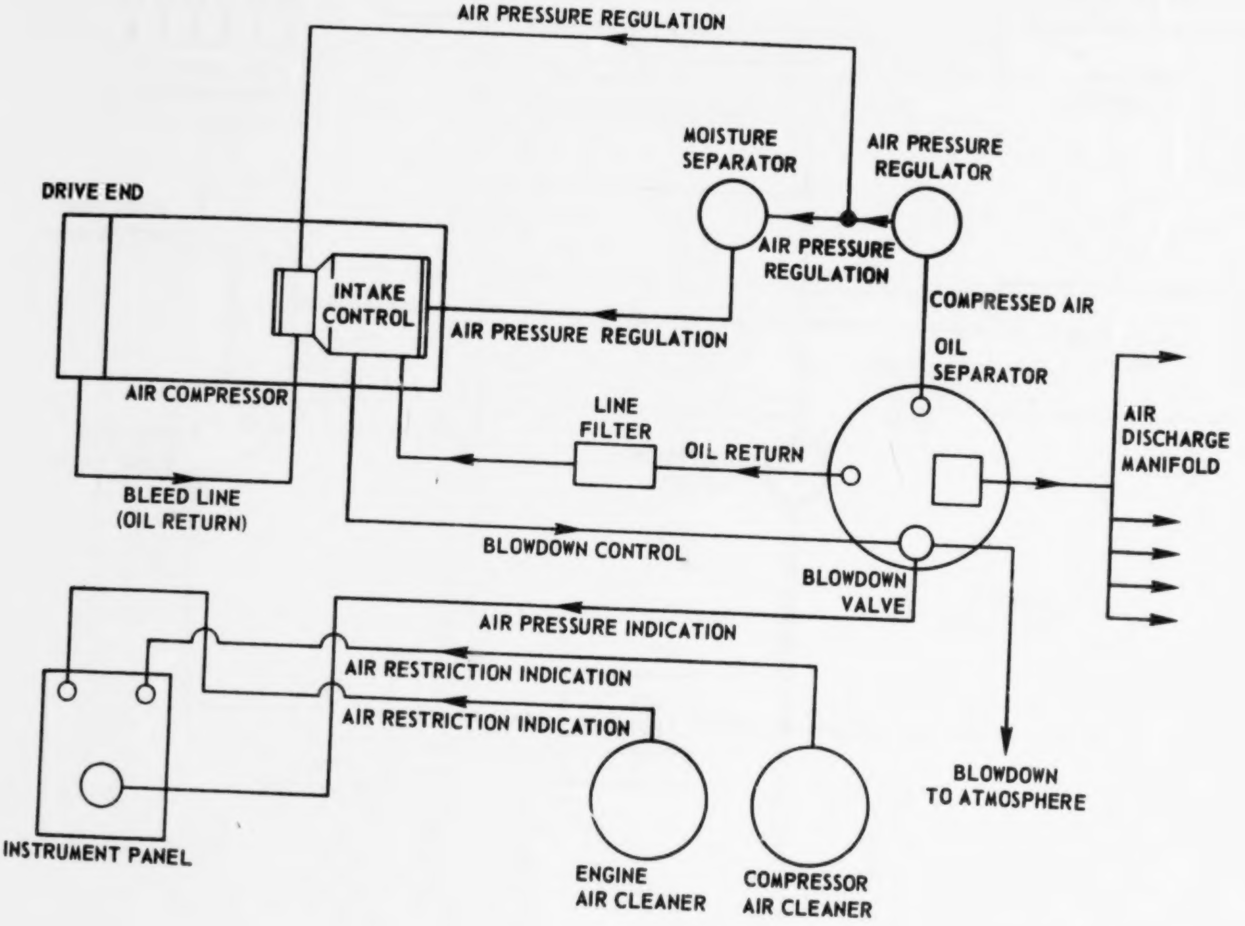

BATTERIES
CHARGING RECEPTACLE
STARTING MOTOR
FUEL RACK SHUTOFF
GLOW PLUGS
HEAT START SWITCH
SENDER FUEL GAUGE
FUEL PRESSURE
PRESSURE SWITCH
FUEL GAUGE
LAMP
TACHOMETER HOURMETER
AIR PRESSURE
OIL TEMPERATURE
SWITCH
PUSHBUTTON SWITCH
ENGINE STOP
COLD WEATHER START
AMMETER
HIGH TEMPERATURE SWITCH
THERMOSTATIC SWITCH
OVERSPEED SWITCH
PRESSURE SWITCH
OIL PRESSURE
WATER TEMPERATURE
PRESSURE SWITCH
GENERATOR
GENERATOR REGULATOR
GL
ST
B

B COMPRESSOR AND ENGINE WIRING

ME 4310-338-15/1-3 ②

Figure 1-3. Wiring Diagram (Sheet 2 of 2).

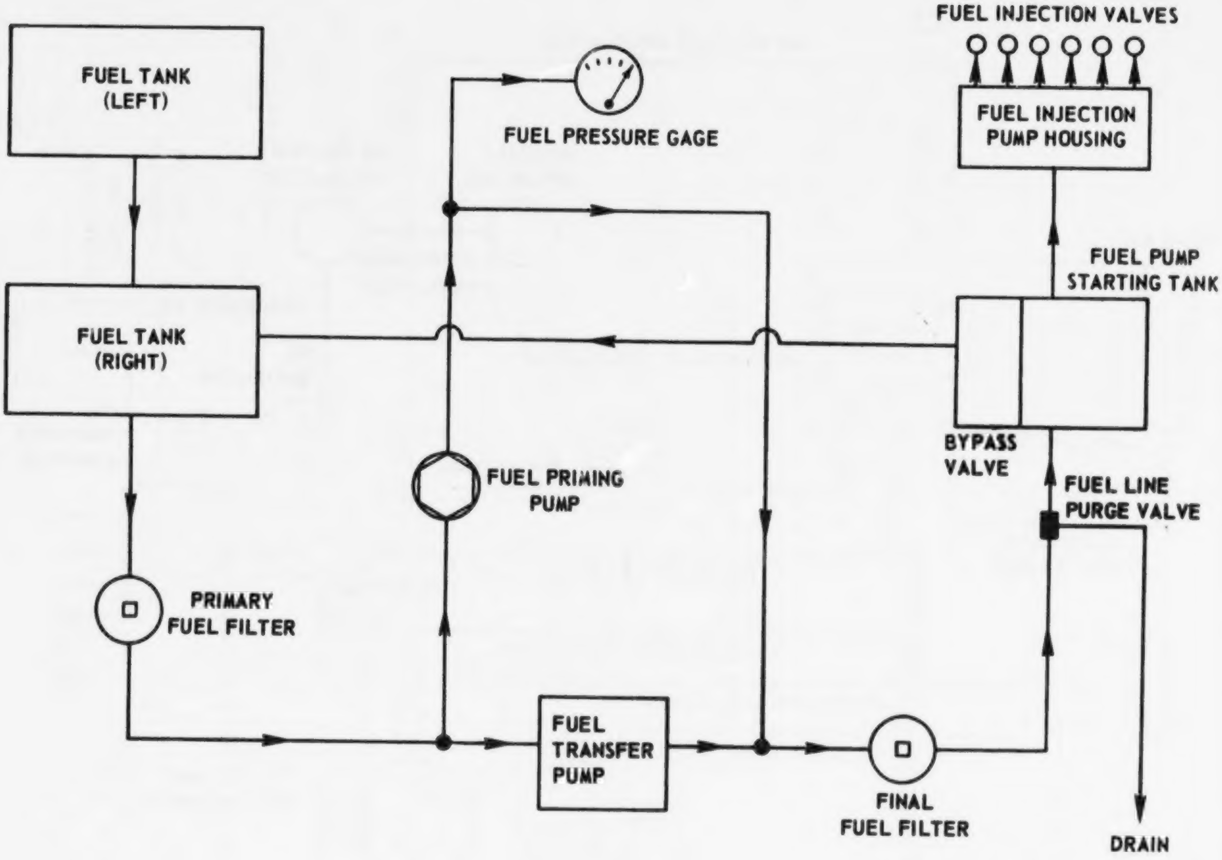
(9) *Pneumatic diagram.* See figure 1-4.


AIR PRESSURE REGULATION
MOISTURE SEPARATOR
AIR PRESSURE REGULATOR
DRIVE END
AIR PRESSURE REGULATION
INTAKE CONTROL
COMPRESSED AIR
AIR PRESSURE REGULATION
OIL SEPARATOR
AIR COMPRESSOR
LINE FILTER
OIL RETURN
AIR DISCHARGE MANIFOLD
BLEED LINE (OIL RETURN)
BLOWDOWN CONTROL
BLOWDOWN VALVE
AIR PRESSURE INDICATION
AIR RESTRICTION INDICATION
AIR RESTRICTION INDICATION
BLOWDOWN TO ATMOSPHERE
INSTRUMENT PANEL
ENGINE AIR CLEANER
COMPRESSOR AIR CLEANER

ME 4310-338-15/1-4

Figure 1-4. Pneumatic diagram.

(10) *Fuel distribution diagram.* See figure 1-5.


FUEL INJECTION VALVES
FUEL TANK (LEFT)
FUEL PRESSURE GAGE
FUEL INJECTION PUMP HOUSING
FUEL PUMP STARTING TANK
FUEL TANK (RIGHT)
BYPASS VALVE
FUEL PRIMING PUMP
FUEL LINE PURGE VALVE
PRIMARY FUEL FILTER
FUEL TRANSFER PUMP
FINAL FUEL FILTER
DRAIN

ME 4310-338-15/1-5

Figure 1-5. Fuel distribution diagram.

(11) *Air brake diagram.* See figure 1-6.

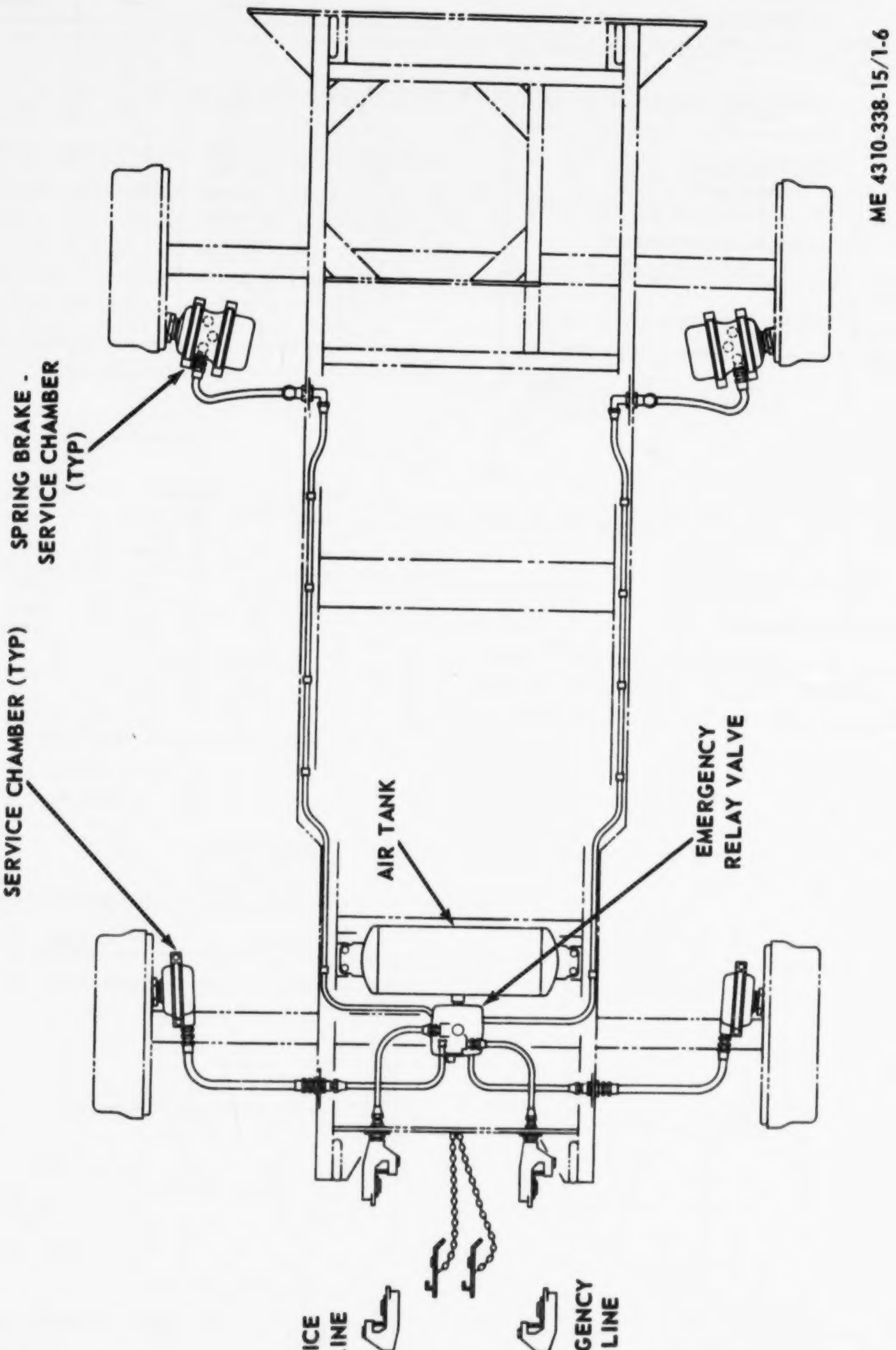

SERVICE CHAMBER (TYP)
SPRING BRAKE - SERVICE CHAMBER (TYP)
AIR TANK
EMERGENCY RELAY VALVE
SERVICE AIR LINE
EMERGENCY AIR LINE
ME 4310-338-15/1-6

Figure 1-6. Air brake diagram.

(12) *Safety wiring diagram.* See figure 1-7.

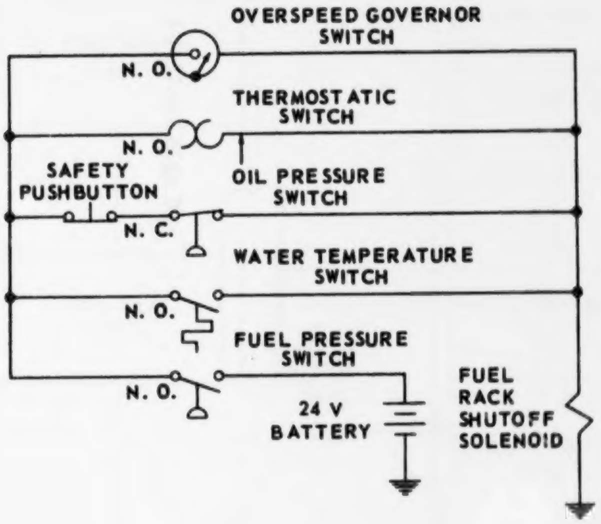

OVERSPEED GOVERNOR SWITCH
N. O.
THERMOSTATIC SWITCH
N. O.
SAFETY PUSHBUTTON
OIL PRESSURE SWITCH
N. C.
WATER TEMPERATURE SWITCH
N. O.
FUEL PRESSURE SWITCH
N. O.
24 V BATTERY
FUEL RACK SHUTOFF SOLENOID
ME 4310-338-15/1-7

Figure 1-7. Safety wiring diagram.

1-5. Difference in Models

This manual covers only the Davey Compressor Company Model 1M600RPV Rotary Air Compressor. No known differences exist for the model covered by this manual.

Table 1-1. Engine Assembly Torque Table

Size	Foot-pounds	Taperlock studs	Foot-pounds
1/4"	6-12	1/4"	3-7
5/16"	13-23	5/16"	7-13
3/8"	27-37	3/8"	17-23
7/16"	40-60	7/16"	25-35
1/2"	65-85	1/2"	35-45
9/16"	95-125	9/16"	50-70
5/8"	130-170	5/8"	65-85
3/4"	230-300	3/4"	95-125
7/8"	360-480	7/8"	150-190
1"	560-720	1"	230-290
1-1/8"	700-900	1-1/8"	290-350
1-1/4"	880-1120	1-1/4"	360-440
1-3/8"	1050-1350	1-3/8"	440-520
1-1/2"	1300-1700	1-1/2"	500-600

Table 1-2. Air Compressor Unit Torque Table

Size	Foot-pounds	Size	Foot-pounds	Size	Foot-pounds
1/4"	6	3/4"	150	1-5/8"	1448
5/16"	11	7/8"	202	1-3/4"	1884
3/8"	19	1"	300	1-7/8"	2336
7/16"	30	1-1/8"	474	2"	2721
1/2"	45	1-1/4"	659	2-1/4"	3417
9/16"	66	1-3/8"	884	2-1/2"	4380
5/8"	93	1-1/2"	1057	2-3/4"	7319

CHAPTER 2
INSTALLATION AND OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Inspecting and Servicing Equipment

This Model 1M600RPV Rotary Air Compressor is shipped by the manufacturer as a completely assembled four-wheel, trailer mounted unit. Lifting provisions are incorporated on the compressor unit as shown in figure 2-1.

a. Unloading. The air compressor unit can be unloaded by a lifting device or towed from the carrier.

WARNING

The lifting device used must be capable of lifting a minimum of 12,000 pounds.

(1) If a lifting device is to be used, connect the device to the air compressor unit as shown in figure 2-1.

(2) Remove all blocks and tie downs that secure air compressor unit to carrier. Release parking brakes.

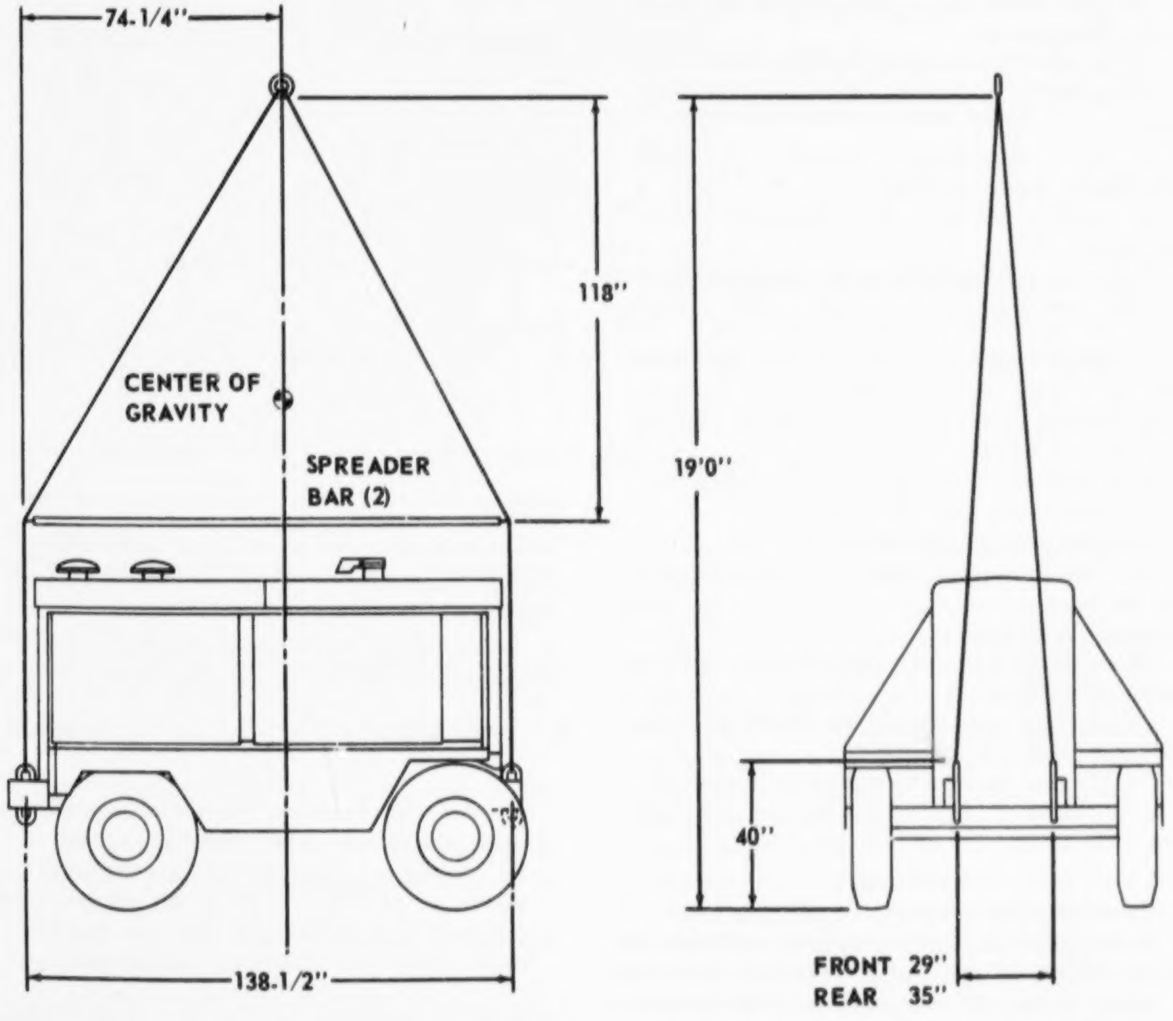


Figure 2-1. Lifting instructions.

CAUTION

After unloading and parking the unit, be sure to lock parking brakes.

(3) Lift or tow air compressor unit off carrier.

b. Unpacking and Deprocessing.

(1) Remove all crating, blocking, and protective material.

(2) Remove separately packed components from air compressor unit.

(3) Carefully unpack components and inspect for any damage. Refer to paragraph 2-2 for instructions on installing separately packed components.

(4) Refer to DA Form 2258 (Depreservation Guide for Vehicles and Equipment) furnished with unit and complete deprocessing before any servicing is attempted.

c. Inspecting Equipment.

(1) Check identification plates for positive identification of equipment.

(2) Check equipment against packing list.

(3) Inspect for and tighten any loose nuts, bolts, and screws.

(4) Inspect all controls, instruments, and gages for damage or loose mountings.

(5) Check all accessories for damage and loose or missing hardware.

(6) Inspect all electrical wiring for frayed insulation or other damage. See wiring diagram, figure 1-3.

(7) Check condition of fan drive belts. Check drive belt tension (fig. 3-47). Ensure that fan is securely mounted and that there is clearance between fan blades and radiator core.

(8) Inspect all piping, air tubing, and hose assemblies for loose connections or damage.

(9) Check tires for slow leaks or damage.

(10) Check external lights for broken glass or other damage.

d. Servicing Equipment.

(1) Perform daily and before operation maintenance services (para 3-6).

(2) Lubricate equipment in accordance with Lubrication Order (LO) 5-4310-338-12.

(3) Fill fuel tanks and engine cooling system. Refer to tabulated data, paragraph 1-4, for capacities. Refer to table 2-1 for antifreeze data.

WARNING

To prevent serious burns when filling batteries, take precautions against spilling electrolyte on clothing or allowing it to come in contact with skin or eyes. Use rubber gloves.

(4) Fill batteries with electrolyte to a level of approximately 3/8-inch above plates. Specific gravity must be 1.250 or higher when checked with a hydrometer.

(5) For cold weather operation, lubricate equipment in accordance with Lubrication Order (LO) 5-4310-338-12. Refer to table 2-1 for antifreeze data.

2-2. Installation of Separately Packed Components

a. Remove and unpack the intervehicular air brake hoses. Connect hoses to SERVICE and EMERGENCY couplings, and to dummy couplings.

b. Remove and unpack intervehicular electrical cable. Connect cable to receptacle on front of unit and place loose end in cable hanger.

c. Fill batteries with electrolyte as described in paragraph 2-1. Observe the warning.

Table 2-1. Freezing Points, Composition, and Specific Gravities of Military Antifreeze Materials

Lowest expected ambient temp. °F	Pints of inhibited glycol per gallon of coolant [1]	Compound, antifreeze arctic [2]	Ethylene glycol solution specific gravity at 68°F [3]
+20	1-1/2	Issued full strength and ready mixed for 0° to -65°F temperatures for both initial installation and replenishment of losses.	1.022
+10	2		1.036
0	2-3/4		1.047
-10	3-1/4		1.055
-20	3-1/2		1.062
-30	4		1.067
-40	4-1/4		1.073
-50	Arctic Anti-freeze preferred	DO NOT DILUTE WITH WATER OR ANY OTHER SUBSTANCE	
-60			
-75			

[1] **Maximum protection is obtained at 60 percent by volume (4.8 pints of ethylene glycol per gallon of solution).**

[2] **Military Specification MIL-C-11755 Arctic type, nonvolatile antifreeze compound is intended for use in the cooling system of liquid-cooled internal combustion engines. It is used for protection against freezing primarily in Arctic regions where ambient temperature remains for extended periods close to —40°F or drops below, to as low as —90°F.**

[3] **Use an accurate hydrometer. To test hydrometer, use 1 part ethylene glycol antifreeze to 2 parts water. This should produce a hydrometer reading of 0°F.**

Note. **Fasten a tag near the radiator filler cap indicating the type antifreeze.**

2-3. Installation or Setting Up Instructions

CAUTION

The air compressor unit should be located in an area as free of dust and dirt as possible. A highly contaminated atmosphere places an abnormal load on air cleaner, oil filter, and compressor, and can result in an increase in maintenance problems.

a. Tow air compressor unit to worksite and select a location as near level as possible. Out-of-level shall not exceed 15 degrees in any direction.

b. Lock parking brakes.

c. Disconnect air brake hoses, intervehicular wiring, safety chains, and towbar from towing vehicle. Secure air hoses to dummy couplings. Secure intervehicular electrical cable in hanger.

CAUTION

When open, ensure that side doors are fully secured.

d. Open side doors.

e. Connect air hoses and tools to air discharge connections as required.

WARNING

Do not operate air compressor unit in a building or any enclosed area unless exhaust gases are piped outside. Inhalation of exhaust gases can result in serious illness or death.

f. The indoor setup procedure is the same as that described in steps *a* through *e* above except observe above warning.

Section II. MOVEMENT TC A NEW WORKSITE

2-4. Dismantling for Movement

a. Stop air compressor unit (para 2-10).

b. Remove air hoses and tools from air discharge connections.

c. Close and secure side doors.

NOTE

The air compressor unit is self-contained and requires no disassembly for movement.

d. Attach tow bar to towing vehicle. Attach and secure safety chains to towing vehicle.

e. Connect air brake intervehicular hoses to towing vehicle.

f. Connect intervehicular electrical cable between air compressor unit and towing vehicle.

g. Release parking brakes.

CAUTION

Maximum towing speed is 25 miles per hour over unpaved roads and 5 miles per hour over uneven surfaced open fields.

h. Test air brakes and lights to ensure proper operation.

2-5. Reinstallation After Movement

Refer to paragraph 2-3 for installation or setting-up instructions after movement to a new worksite.

Section III. CONTROLS AND INSTRUMENTS

2-6. General

This section contains the description of the various controls and instruments on the Model 1M600RPV Rotary Air Compressor. This data provides operating and maintenance personnel with sufficient information to ensure proper operation of the air compressor.

2-7. Controls and Instruments

a. Instrument Panel Controls and Instruments (fig. 2-2).

(1) *Oil pressure gage.* This gage indicates engine lubricating oil pressure. Normal oil pressure is 60 to 70 PSI at 1800 RPM.

(2) *Fuel gage.* This gage indicates the level of fuel in the fuel tanks.

(3) *Ammeter.* This gage indicates rate of battery charge or discharge.

(4) *Water temperature gage.* This gage indicates the engine water temperature. The normal operating range after warmup is 170° to 190° F.

(5) *Compressor oil temperature gage.* This gage indicates the compressor oil temperature. The normal operating range after warmup is 170° to 220° F.

(6) *Tachometer-hourmeter.* This gage indicates the speed of the engine in revolutions per minute (RPM). The normal operating range is from 1000 to 1800 RPM. The gage also records elapsed engine running time in hours and tenths of hours.

(7) *Fuel pressure gage.* This gage indicates engine fuel pressure. Normal fuel pressure is 25 PSI minimum at 1800 RPM.

(8) *Air pressure gage.* This gage indicates the air pressure in the oil separator tank. The normal operating range is 80 to 105 PSI when the air compressor is running loaded and 115 to 120 PSI when running unloaded.

(9) *Air cleaner restriction indicators.* These indicators monitor the air pressure drop through the air cleaners. When the pressure drop of air is satisfactory, the indicators show green. When air is re-

structed by dirt or any other reason, the indicators show red. After the restriction is cleared, reset the indicators by pressing down on top of the cap until green is showing.

(10) *Lamp switch.* This switch controls the illuminating and extinguishing of the instrument panel lamp. A switch plate shows the ON and OFF positions.

(11) *HEAT-START switch.* This is a three-position, springloaded, return-to-center type switch. The HEAT position applies power to the cylinder head glow plugs (table 2-2). The START position energizes the starting motor solenoid for cranking the engine.

(12) *Safety pushbutton switch.* This pushbutton type switch overrides the engine oil pressure safety switch to allow starting of the engine.

(13) *Engine stop control cable.* This control cable, when pulled all the way out, shuts down the engine by mechanically moving the fuel rack to the extreme "fuel off" position.

(14) *Cold weather starting aid control cable.* This control cable is used to inject cold weather starting aid fuel into the engine air intake (table 2-2).

b. Safety Circuit Switches. (fig. 2-3).

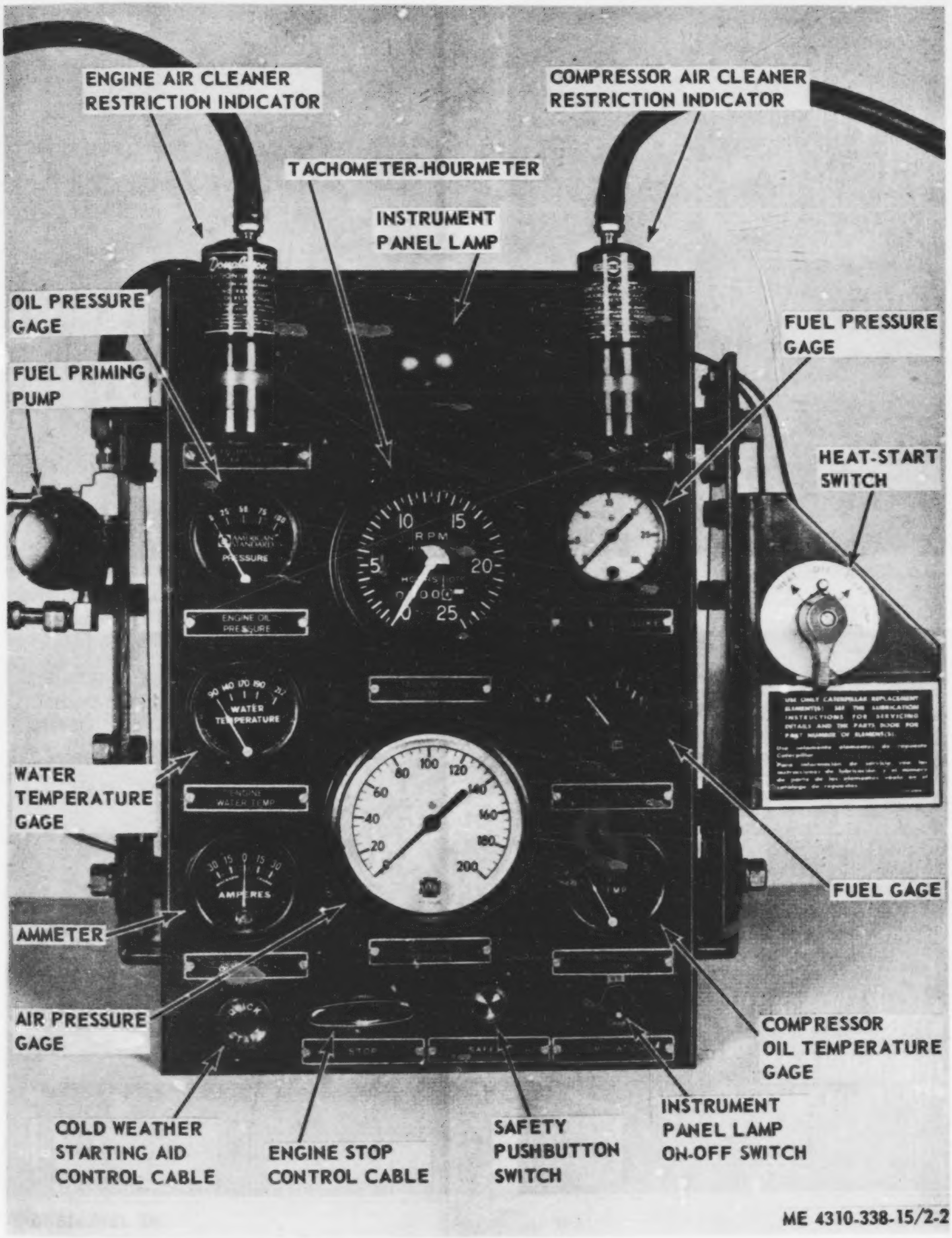
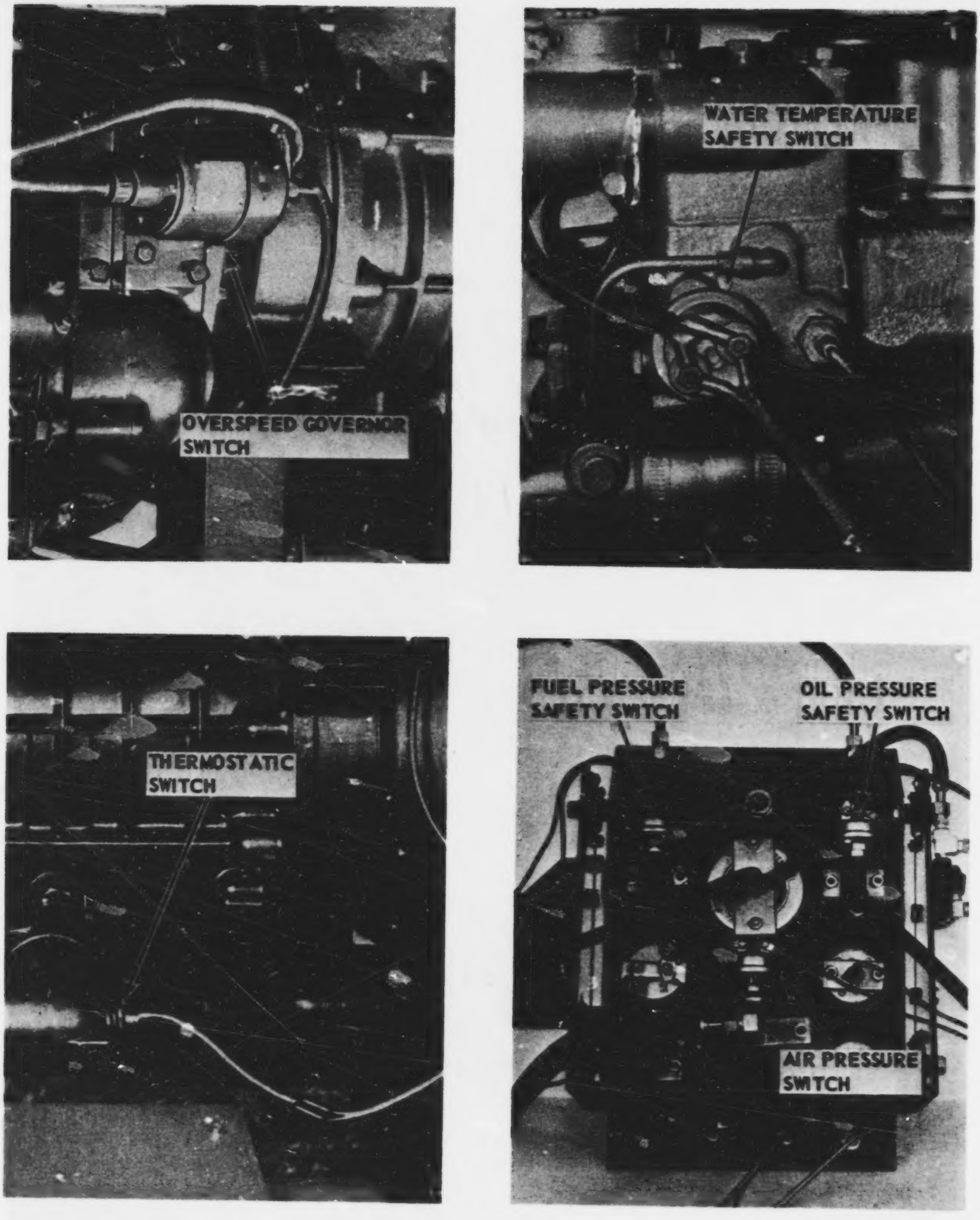

ENGINE AIR CLEANER RESTRICTION INDICATOR
COMPRESSOR AIR CLEANER RESTRICTION INDICATOR
TACHOMETER-HOURMETER
INSTRUMENT PANEL LAMP
OIL PRESSURE GAGE
FUEL PRIMING PUMP
FUEL PRESSURE GAGE
HEAT-START SWITCH
WATER TEMPERATURE GAGE
FUEL GAGE
AMMETER
AIR PRESSURE GAGE
COMPRESSOR OIL TEMPERATURE GAGE
INSTRUMENT PANEL LAMP ON-OFF SWITCH
COLD WEATHER STARTING AID CONTROL CABLE
ENGINE STOP CONTROL CABLE
SAFETY PUSHBUTTON SWITCH
ME 4310-338-15/2-2

Figure 2-2. Intrument panel, controls and instruments.


OVERSPEED GOVERNOR SWITCH
WATER TEMPERATURE SAFETY SWITCH
THERMOSTATIC SWITCH
FUEL PRESSURE SAFETY SWITCH
OIL PRESSURE SAFETY SWITCH
AIR PRESSURE SWITCH

ME 4310-338-15/2-3

Figure 2-3. Air Compressor unit safety circuit switches.

(1) *Thermostatic switch.* This switch is a temperature sensing device which shuts down the engine if compressed air reaches an unsafe temperature of 230°F to 240°F. The switch is connected to the fuel rack shutoff solenoid.

(2) *Engine oil pressure safety switch.* This switch is a pressure sensing device which shuts down the engine if oil pressure drops to an unsafe level. The switch is connected to the fuel rack shutoff solenoid.

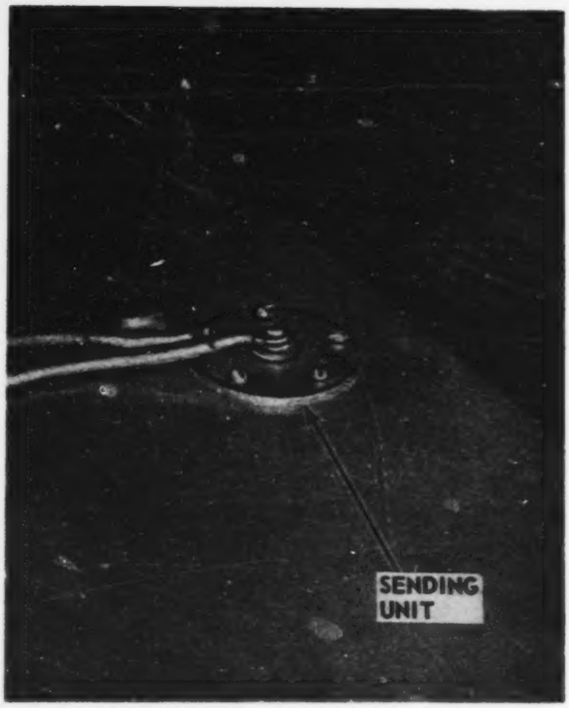
(3) *Engine water temperature safety switch.* This switch is a temperature sensing device which shuts down the engine if engine coolant reaches an unsafe high level. The switch is connected to the fuel rack shutoff solenoid.

(4) *Engine overspeed governor switch.* This is a centrifugal type switch which shuts down the engine if the RPM rate reaches an unsafe high level. The switch is connected to the fuel rack shutoff solenoid.

(5) *Fuel pressure switch.* This switch energizes when fuel pressure reaches 4 PSI, and actuates the engine shutdown safety circuit. See figure 1-7.

(6) *Air pressure switch.* This switch is connected in series between the starting motor solenoid and HEAT-START switch. The switch prevents the engine from being started when air pressure in the system exceeds 10 PSI. See figure 1-7.

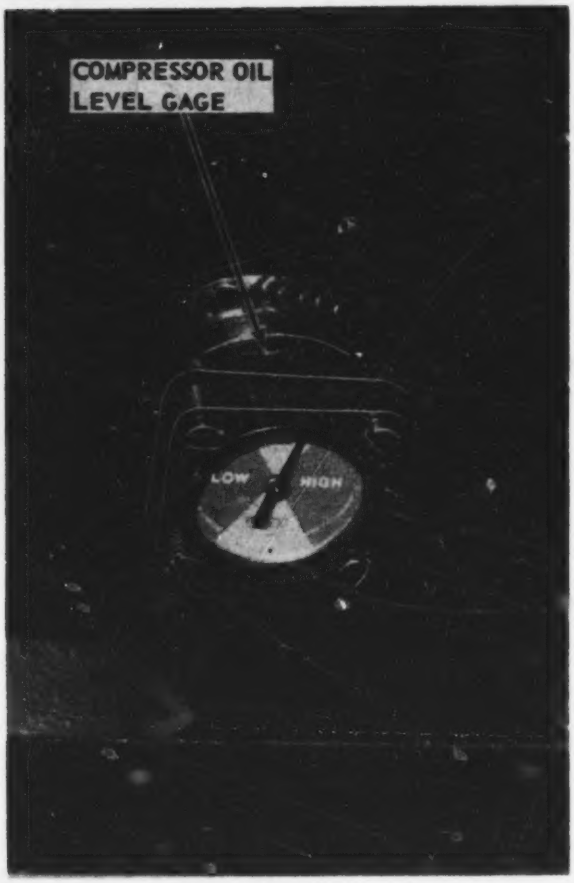
c. Fuel Tank Sending Unit (fig. 2-4). This sending unit transmits to the fuel gage a signal which deflects the gage needle to a reading corresponding to the fuel level in the tanks.



ME 4310-338-15/2-4

Figure 2-4. Fuel tank sending unit.

d. Compressor Oil Level Gage (fig. 2-5). This gage indicates the level of compressor oil in the oil separator tank. Normal oil level indication is at high end of white area between LOW and HIGH or just into the red HIGH area.

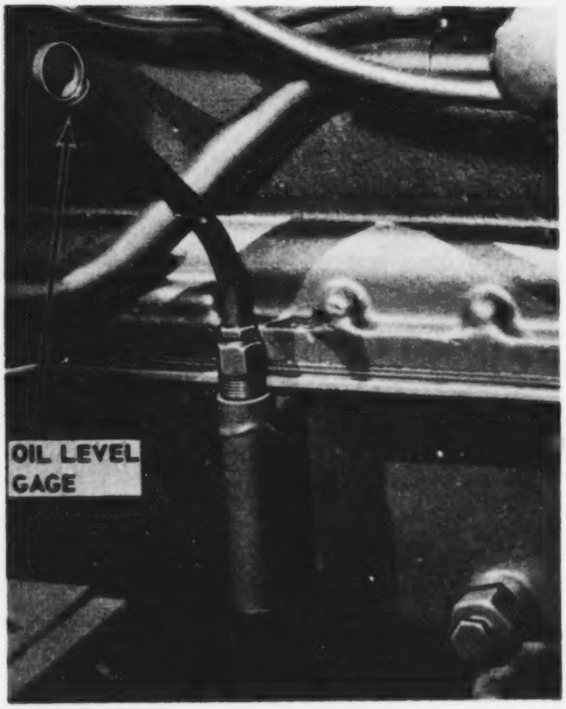

COMPRESSOR OIL LEVEL GAGE
LOW
HIGH

ME 4310-338-15/2-5

Figure 2-5. Compressor oil level gage.

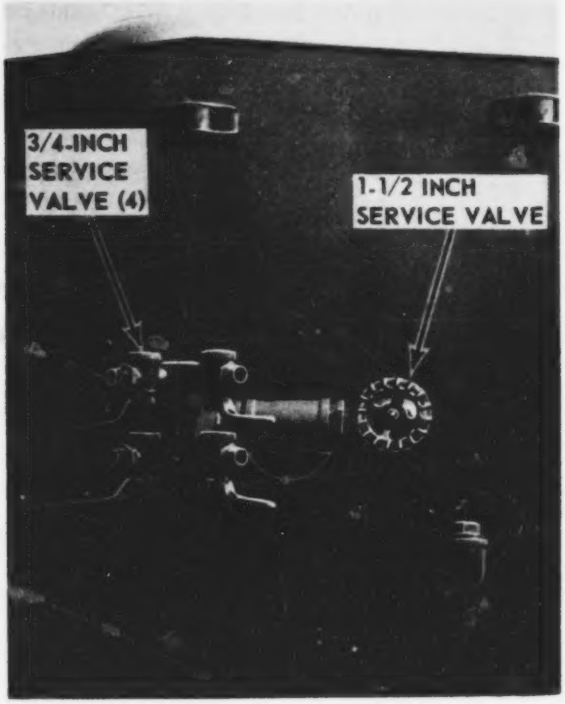
e. Engine Oil Level Gage (fig. 2-6). This gage is a bayonet type dipstick which indicates the oil level within the engine. The gage is graduated on both sides so that the oil can be checked with the engine stopped or idling.

f. Air Discharge Service Valves (fig. 2-7). These inline valves control the output of air from the air discharge manifold to the service tools.


OIL LEVEL GAGE

ME 4310-338-15/2-6

Figure 2-6. Engine oil level gage.


3/4-INCH SERVICE VALVE (4)
1-1/2 INCH SERVICE VALVE

ME 4310-338-15/2-7

Figure 2-7. Air discharge service valves.

Section IV. OPERATION UNDER USUAL CONDITIONS

2-8. General

a. The instructions in this section are published for the information and guidance of personnel responsible for operating the Model 1M600RPV Rotary Air Compressor.

b. The operator must know how to perform every operation of which the air compressor unit is capable. This section contains instructions on starting, operating, and stopping the air compressor unit, and coordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

2-9. Starting

a. Preparation for Starting.

(1) Perform the necessary daily preventive maintenance services (para 3-6).

(2) Check air demand requirements.

b. Starting. Refer to figure 2-8 and start the air compressor unit.

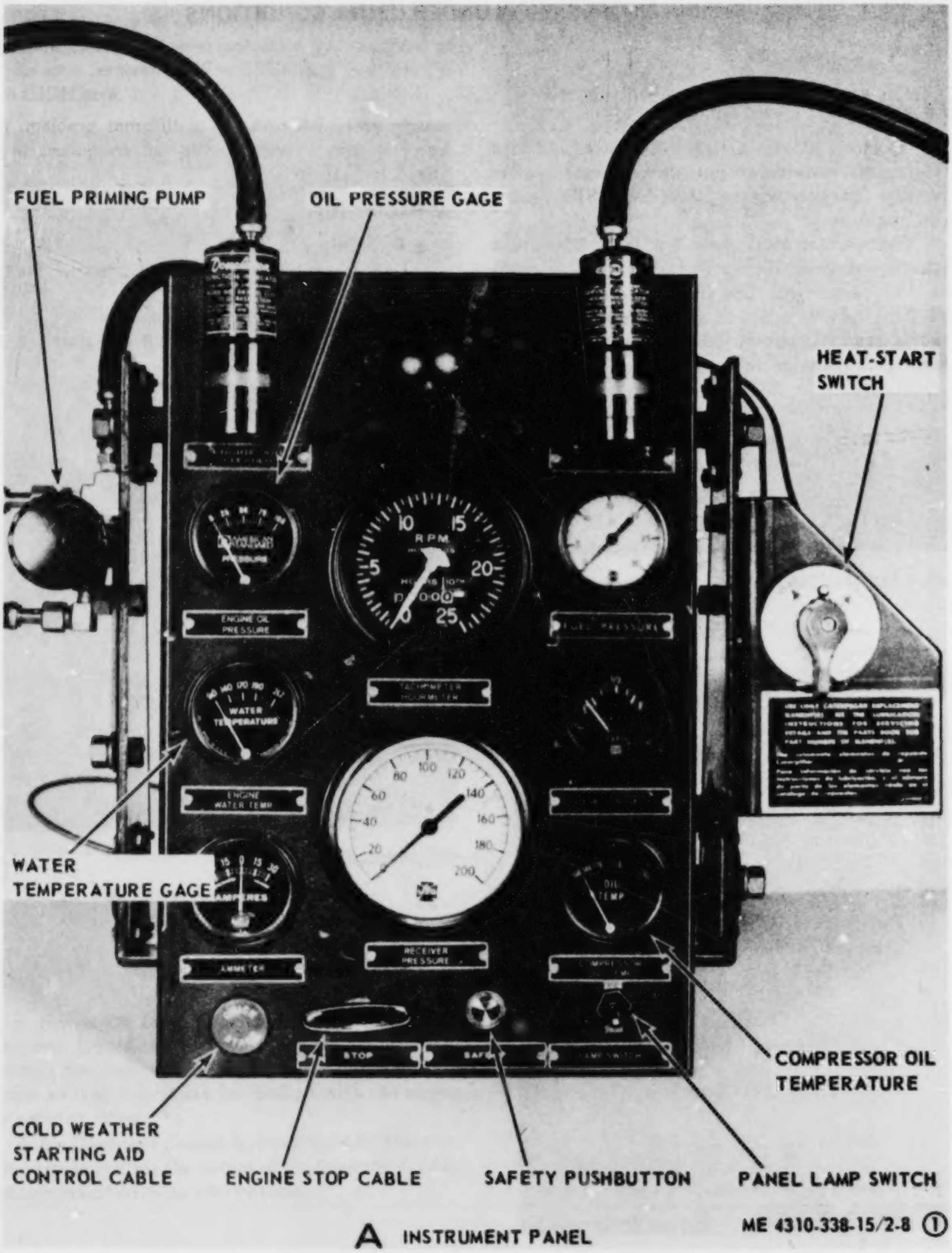
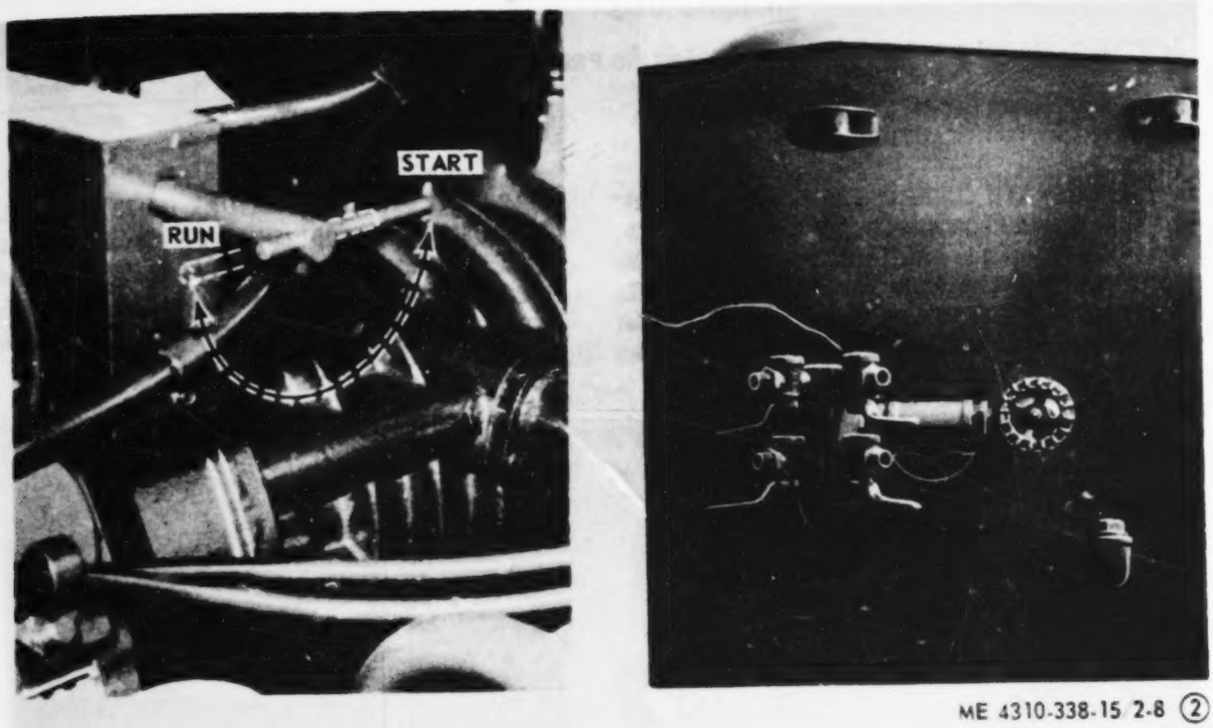

FUEL PRIMING PUMP
OIL PRESSURE GAGE
HEAT-START SWITCH
WATER TEMPERATURE GAGE
COMPRESSOR OIL TEMPERATURE
COLD WEATHER STARTING AID CONTROL CABLE
ENGINE STOP CABLE
SAFETY PUSHBUTTON
PANEL LAMP SWITCH
ME 4310-338-15/2-8 ①
A INSTRUMENT PANEL
ENGINE OIL PRESSURE
TACHOMETER HOURMETER
FUEL PRESSURE
ENGINE WATER TEMP
RECEIVER PRESSURE
AMMETER
STOP
SAFETY
LAMP SWITCH

Figure 2-8. Air compressor unit starting procedure (sheet 1 of 3).


START
RUN
ME 4310-338-15 2-8 ②

B RUN-START LEVER

C AIR DISCHARGE VALVES

Figure 2-8. Air compressir unit starting procedure (sheet 2 of 3).

STARTING PROCEDURE

CAUTION

DO NOT OPERATE COMPRESSOR WITH LESS THAN 80 PSI IN SEPARATOR TANK. IF END USE ALLOWS PRESSURE TO FALL BELOW 80 PSI, PARTIALLY CLOSE AIR DISCHARGE VALVE. EQUIPMENT OPERATION BELOW 80 PSI CAUSES OVERHEATING OF COMPRESSOR AND EXCESSIVE OIL CONSUMPTION.

STEP 1. BE CERTAIN THAT ALL AIR DISCHARGE VALVES ARE CLOSED.

STEP 2. PULL ENGINE STOP CABLE ALL THE WAY OUT. PLACE HEAT-START SWITCH IN START POSITION AND ALLOW ENGINE TO TURN OVER FOR THREE SECONDS. RELEASE HEAT-START SWITCH TO OFF POSITION.

STEP 3. PUSH ENGINE STOP CABLE ALL THE WAY IN. PLACE SPEED CONTROL RUN-START LEVER IN START POSITION.

STEP 4. PRIOR TO STARTING, THE FUEL SYSTEM MUST BE PURGED OF AIR AND PRESSURIZED. OPEN VENT VALVE AND OPERATE FUEL PRIMING PUMP UNTIL A STREAM OF FUEL, WITHOUT AIR BUBBLES, FLOWS FROM VENT LINE. CLOSE VENT VALVE. LOCK PUMP HANDLE.

STEP 5. IF AMBIENT AIR TEMPERATURE IS BELOW +60°F., PLACE HEAT-START SWITCH IN HEAT POSITION AS RECOMMENDED IN TABLE 2-2.

CAUTION

IF AMBIENT AIR TEMPERATURE IS +32°F. OR BELOW, USE ONLY ONE SHOT OF STARTING AID FUEL. EXCESSIVE STARTING AID FUEL CAN CAUSE SEVERE ENGINE DAMAGE. INJECT STARTING AID FUEL ONLY WHEN ENGINE IS CRANKING.

STEP 6. AFTER INDICATED HEAT TIME HAS ELAPSED, MOVE SWITCH TO START POSITION AND DEPRESS AND HOLD SAFETY SWITCH. IF AMBIENT AIR TEMPERATURE IS +32°F. OR BELOW, USE COLD WEATHER STARTING AID.

CAUTION

DO NOT HEAT GLOW PLUGS AFTER ENGINE IS RUNNING SMOOTHLY OR HAS REACHED OPERATING TEMPERATURE. IF ENGINE DOES NOT START AFTER CRANKING FOR 30 SECONDS, RELEASE START SWITCH AND LET STARTING MOTOR COOL FOR TWO MINUTES BEFORE ATTEMPTING ANOTHER START.

STEP 7. WHEN ENGINE STARTS, PLACE HEAT-START SWITCH IN HEAT POSITION UNTIL ENGINE IS RUNNING SMOOTHLY, THEN RELEASE TO OFF POSITION. RELEASE SAFETY SWITCH WHEN ENGINE OIL PRESSURE IS NORMAL.

STEP 8. CHECK ALL GAGES DURING WARMUP PERIOD TO ENSURE EQUIPMENT IS OPERATING PROPERLY.

STEP 9. WHEN ALL SYSTEMS REACH OPERATING TEMPERATURES, PLACE SPEED CONTROL RUN-START LEVER IN RUN POSITION.

ME 4310-338-15/2-8 ③

Figure 2-8. Air compressor unit starting procedure (sheet 3 of 3).

Table 2-2. Starting Aid Chart

Starting temperature	Glow plug heat time	Cold weather starting aid
Above +60°F.	None	No
+60°F. to +32°F.	1 to 2 Minutes	No
+32°F. to 0°F.	1 to 2 Minutes	Yes*
Below 0°F.	1 to 3 Minutes	Yes*

***CAUTION:* To prevent serious damage to the engine, inject starting aid fuel *only* when engine is cranking. Use only one shot per start.**

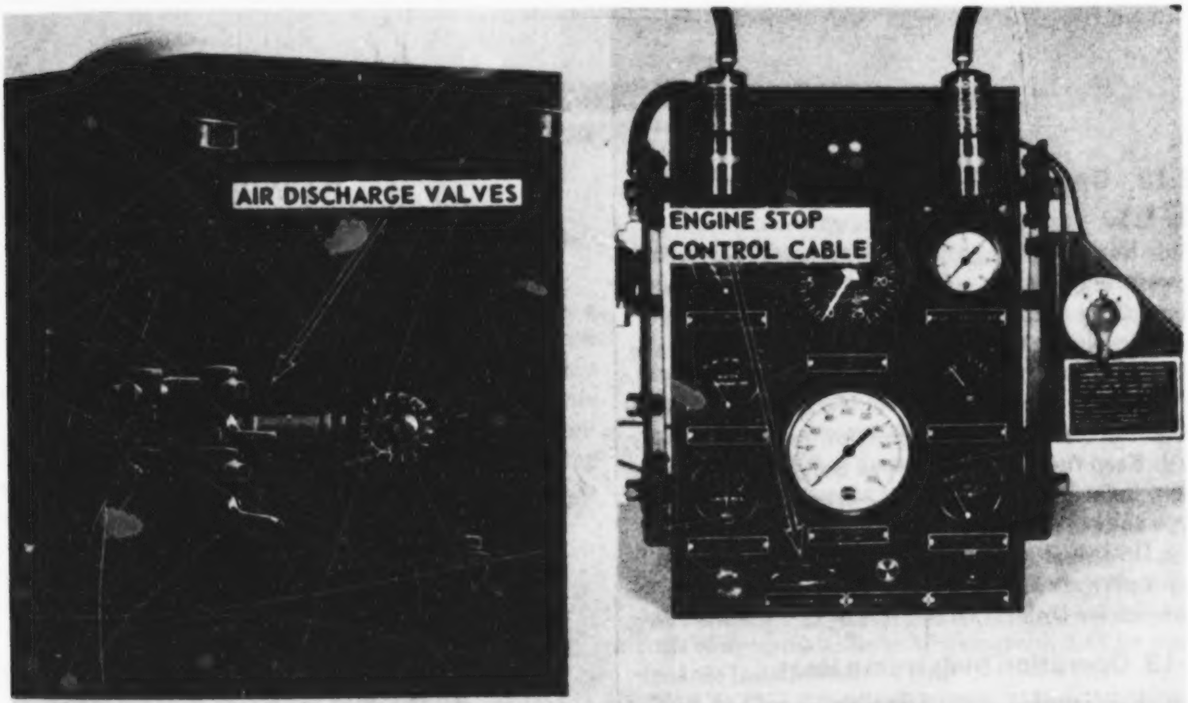
2-10. Stopping

a. Refer to figure 2-9 and stop the air compressor unit.

d. Perform the necessary daily preventive maintenance services (para 3-6).

2-11. Operation of Equipment

a. General. The air compressor unit is used in general construction work for any purpose that requires continuous compressed air. The air discharge manifold provides five connections for attaching pneumatic tools and accessories to the air compressor.



ME 4310-338-15/2-9

STOPPING PROCEDURE

STEP 1. CLOSE ALL AIR DISCHARGE VALVES. ENGINE SHOULD RETURN TO IDLE POSITION.

STEP 2. ALLOW ENGINE TO IDLE FOR FIVE MINUTES.

STEP 3. UNLOCK AND PULL ENGINE STOP CONTROL. COMPRESSED AIR WILL AUTOMATICALLY BLOW DOWN AFTER ENGINE IS STOPPED.

Figure 2-9. Air Compressor Unit Stopping Procedure.

b. Operating Air Compressor Unit. Basically, the air compressor unit is automatically operated after initial starting and warm-up and requires only periodic inspection and servicing during the operating cycle. As the air output demand increaes, the compressor unit speeds up to maintain a continuous supply of compressed air. The operator should periodically observe the various gages to ensure that no malfunction exists and that the unit is operating at its fullest capabilities. The air supply to each pneumatic tool is controlled by service valves on the air discharge manifold.

CAUTION

Do not operate compressor with less than 80 PSI in separator tank. If end use allows pressure to fall below 80 PSI, partially close air discharge valve. Equipment operation below 80 PSI causes overheating of compressor and excessive oil consumption.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2-12. Operation in Extreme Cold (below 0 °F.)

a. Ensure that antifreeze solution is correct for lowest temperature anticipated. Refer to table 2-1 for antifreeze data.

b. Inspect cooling system for leaks or blockage. Correct or report any defects.

c. Keep batteries fully charged. After adding water to batteries, run engine for at least one hour.

d. Keep fuel tanks full when unit is not in operation. Refer to tabulated data, paragraph 1-4, for fuel type and tank capacity.

e. Drain and service fuel filter (para 3-12).

f. Lubricate air compressor unit in accordance with Lubrication Order (LO) 5-4310-338-12.

2-13. Operation in Extreme Heat

a. Keep engine cooling system clean and full of coolant. Inspect cooling system often and correct or report any leaks or other malfunction.

b. Locate the air compressor unit in a well ventilated area. Keep side doors open during operation to promote good air circulation.

c. Keep air compressor unit lubricated in accordance with Lubrication Order (LO) 5-4310-338-12.

2-14. Operation in Dusty or Sandy Areas

A highly contaminated dusty or sandy area places an extra load on the air cleaners, oil filters, engine and compressor with the possibility of increased wear and maintenance. Therefore, servicing of the unit must be performed at much shorter intervals as inspection reveals the presence of contamination in the oil supplies and air cleaners. The following steps outline the operating procedures.

WARNING

Do not operate air compressor unit in an enclosed or sheltered area unless the exhaust gases are piped outside. Inhalation of gases will result in serious illness or death.

a. Locate air compressor in a sheltered area, if possible.

b. Keep entire unit as clean as possible.

c. Lubricate unit in accordance with Lubrication Order (LO) 5-4310-338-12 except intervals should be more frequent when inspections indicate service should be performed.

d. Repeatedly check air cleaner restriction indicators and service air filters as required.

e. Periodically wet down surrounding area to help keep down dust.

2-15. Operation Under Rainy or Humid Conditions

a. Wipe all exposed areas frequently.

b. Cover air compressor unit when not in operation.

c. Keep electrical components clean and dry.

d. Inspect air cleaners and oil supplies frequently for contamination. Service in accordance with Lubrication Order (LO) 5-4310-338-12.

2-16. Operation in Salt Water Areas

Follow same procedure described in paragraph 2-15, above.

2-17. Operation in Snow

Follow same procedure described in paragraph 2-15, above.

2-18. Operation in Mud

a. Position air compressor unit as level as possible. Out-of-level is not to exceed 15° in any directional plane.

b. If ground is very soft or miry, place blocks, boards, or the equivalent under each wheel to prevent air compressor unit from settling.

c. Take necessary precautions to prevent mud or water from getting inside air discharge hoses and fittings.

d. Thoroughly clean air compressor unit after use.

2-19. Operation in High Altitudes

CAUTION

Check unit frequently for overheating of engine during high-altitude operation.

This air compressor unit operates satisfactorily at high altitudes. However, since barometric pressure (air density) decreases as altitude increaes, a slight loss of compressor efficiency may be noticed at higher altitudes. This ia a normal condition and cannot be prevented.

Section VI. OPERATION OF AUXILIARY MATERIEL USED IN CONJUNCTION WITH THE EQUIPMENT

2-20. Diesel Engine Cold Weather Starting Aid

a. Description. The cold weather starting aid is a measured-shot system which contains an ether base fuel mixture. This fuel mixture, which is highly combustible, is manually injected into the engine air intake manifold. The cold weather starting aid consists of the measured-shot valve, cylinder mounting clamp, atomizer, control cable, and replaceable fuel cylinder.

b. Operation.

WARNING

Do not operate cold weather starting aid at temperatures above 40°F. Do not puncture or mishandle fuel cylinder. The cylinder contains an either base mixture which is extremely toxic, volatile, and combustible.

(1) Pull out control cable (fig. 2-2) for one to two seconds to fill chamber in valve body.

CAUTION

Use only one shot of starting aid fuel for each engine start. Excessive use of starting aid fuel can seriously damage engine.

(2) When engine is cranking, push in control cable to release starting aid fuel into engine air intake manifold.

c. Replacement.

(1) Weigh cylinder to determine remaining fuel capacity. A full cylinder weights 37 ounces; an empty cylinder weights 17 ounces. To determine approximately how many starts are left in a cylinder, allow 5 cc's per shot (39 cc's per ounce).

(2) To replace an empty fuel cylinder, loosen clamp that attaches cylinder to housing and unscrew cylinder from valve. Place new cylinder in valve, screw right, and secure cylinder in place with attaching clamp.

d. Maintenance. Refer to paragraph 3-43 for maintenance instructions.

2-21. Fire Extinguisher (Monobromotrifluoromethane Type)

The monobromotrifluoromethane type fire extinguisher is generally suitable for all types of fire, except fires involved with LOX (liquid oxygen) generating equipment. Refer to TB 5-4200-200-10 for the operation and maintenance of the fire extinguisher.

CHAPTER 3
OPERATOR'S AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S AND ORGANIZATIONAL MAINTENANCE REPAIR PARTS, TOOLS, AND EQUIPMENT

3-1. Tools and Equipment

a. Basic issue tools and repair parts issued with or authorized for the Model 1M600RPV Rotary Air Compressor are listed in the Basic Issue Items List, Appendix B.

b. No special tools or equipment are required by the operator or organizational maintenance personnel for maintaining the Model 1M600RPV Rotary Air Compressor.

3-2. Organizational Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5-4310-338-20P (when printed).

Section II. LUBRICATION

3-3. General Lubrication Information

a. This paragraph contains lubrication instructions which are supplemental to, and not specifically covered in, the lubrication order.

b. For the current lubrication order, refer to LO 5-4310-338-12.

Figure 3-1. Not used.

3-4. Detailed Lubrication Information

a. General. Keep all lubricants in closed containers and store in a cool, clean, dry place. Allow no dust, dirt, or other foreign matter to mix with lubricants. Keep all lubrication equipment clean and ready for use.

b. Cleaning. Keep all external parts not requiring lubrication free of lubricants. Before lubricating the equipment, wipe all lubrication points free of dirt and grease. After lubricating the equipment, clean all lubrication points to prevent accumulation of foreign matter.

c. Points of Lubrication.

CAUTION

Overlubrication may cause equipment failure or damage to working parts.

Service the lubrication points at intervals specified in Table 3-1.

d. Operation Immediately After Lubrication. Inspect all oil lines, fittings and filters for leaks immediately after lubrication and during operation.

e. HDO, OE and OES Oil.

(1) The crankcase oil level must be checked frequently since oil consumption may increase at any time.

(2) The oil may require changing more frequently than usual during cold weather operating conditions, extreme heat conditions, and dusty or sandy conditions. These extreme conditions cause oil contamination by dilution and an increase in sludge formation.

(3) The oil must be changed at least every 50 hours if the fuel used has a sulphur content of more than 0.4 percent. The filter change period can remain at the normal specified time.

(4) The engine crankcase oil used must be a superior lubricant, series three, which conforms to military specification MIL-L-45199.

f. Oil Filter Service. Service engine oil filter and air compressor oil filter at intervals specified in table 3-1.

g. Starting Motor and Generator Service. The starting motor and generator assemblies have sealed bearings and require no service.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-5. General

To ensure that the air compressor unit is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services that are to be performed are described in paragraph 3-6. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Shut down air compressor unit immediately if a malfunction occurs which would damage the equipment if operation were continued. At the earliest possible opportunity, all malfunctions and deficiencies encountered and corrective actions taken shall be recorded on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

3-6. Preventive Maintenance Checks and Services

Preventive maintenance checks and services which must be performed by operating personnel are listed in table 3-1. The steps are in a sequence which allows personnel to proceed systematically from part to part. Information necessary to accomplish a given step, including mechanical tolerances, minimum/maximum adjustment limits, normal gage or instrument readings, when applicable, are included. These are realistic standards and limitations by which maintenance personnel can readily determine the overall operational condition of the air compressor unit. Where applicable, procedures are referenced for accomplishing the preventive maintenance checks or services. If a preventive maintenance check or service is required at an interval other than daily, weekly, monthly, or quarterly, the correct interval is noted in the procedure column. When the interval is indicated in hours, they denote service hours. Such expressions as "replace as necessary" or "fill as necessary" are not used in the procedure column. It is understood that whenever inspection reveals the need of an adjustment, replacement, or refill, the necessary action will be taken.

Section IV. OPERATOR'S MAINTENANCE

3-7. General

This section contains maintenance procedures that are the responsibility of the operator in accordance with the Maintenance Allocation Chart.

Table 3-1. Preventive Maintenance Checks and Services

Item number	Interval						B — Before operation D — During operation	A — After operation W — Weekly	M — Monthly Q — Quarterly
	Operator				Org.				
	Daily			W	M	Q	Item to be inspected	Procedure	Reference
	B	D	A						
1	X			X	X	X	Radiator and oil cooler assembly	Check engine coolant level; proper level is 2 " below filler neck.	Fig. 3-8
	X			X	X	X		Check radiator, hoses, and connections for leaks or defects.	Para 3-71
	X			X	X	X		Check antifreeze level when operating in temperatures below +32°F.	Table 2-1
2	X		X	X	X	X	Fuel tank	Check fuel level. Use gage on instrument panel.	Fig. 2-2

Table 3-1. Preventive Maintenance Checks and Services —Continued.

B – Before operation A – After operation M – Monthly

D – During operation W – Weekly Q – Quarterly

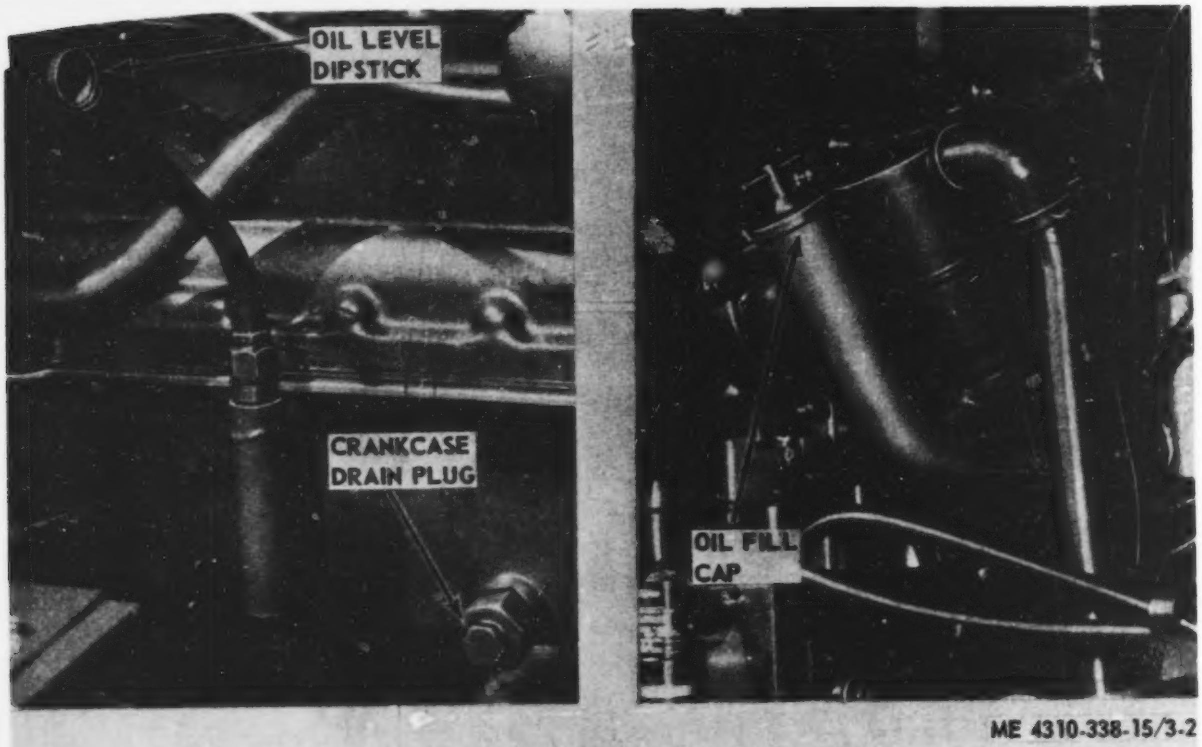
Item number	Interval						Item to be inspected	Procedure	Reference
	Operator				Org				
	Daily			W	M	Q			
	B	D	A						
3	X		X	X	X	X	Engine crankcase	Check oil level. Use dipstick gage.	Fig. 2-6, LO 5-4310-338-12
				X				Change oil. *Note.* If sulphur content of diesel fuel being used is greater than 0.4 percent, change oil every 50 hours.	Fig. 3-2, LO 5-4310-338-12
					X	X		Clean crankcase breather. Wash with clean kerosene or diesel fuel.	Fig. 3-4
4	X		X	X	X	X	Oil separator	Check oil level. Use oil level gage on tank.	Fig. 2-5
					X			Change oil (every 500 hours).	Fig. 3-16, LO 5-4310-338-12
5	X		X	X	X	X	Moisture separator	Drain bolw.	
					X	X		Inspect element.	Para 3-90
6				X		X	Engine oil filter	Change filter elements.	Fig. 3-3, LO 5-4310-338-12
7				X		X	Compressor oil filter	Change filter element.	Fig. 3-3
8				X	X	X	Primary fuel filter	Clean and inspect filter element every 50 hours.	Fig. 3-6
9				X	X	X	Final fuel filter	Drain every 50 hours when operating in temperatures of +32°F. and above.	Fig. 3-6
								Drain every 10 hours when operating in temperatures below +32°F.	Fig. 3-6
					X			Change filter element and gaskets.	Fig. 3-6
10	X				X	X	Drive belts	Check for worn, frayed, or cracked belts.	Para 3-72
				X	X	X		Check for proper belt adjustment.	Fig. 3-47
11				X	X	X	Batteries	Check battery mountings and cable connections.	Para 3-106
				X	X	X		Check electrolyte level. Correct level is 3/8" above plates.	Fig. 3-10
				X	X	X		Remove corrosion from battery terminals and lubricate.	LO 5-4310-338-12
				X				Clean filler cap vent holes.	Fig. 3-10
	X							Check general condition of battery.	
				X				Make hydrometer test.	Para 2-1
12	X	X				X	Speed control linkage	Check linkage for freedom of movement.	
				X	X	X		Lubricate linkage.	Fig. 3-18, LO 5-4310-338-12
					X	X		Check linkage for proper adjustment.	Fig. 3-69
13	X	X	X	X	X	X	Air cleaners	Check restriction indicators.	Fig. 2-2
				X	X	X		Clean element and body Inspect element.	Fig. 3-5
					X	X		Replace element. Clean air cleaner.	Para 3-79
14	X		X		X	X	Controls and instruments	Check for damaged instruments.	Fig. 2-2
	X				X	X		Check for loose mountings.	
		X			X	X		Check instruments for proper operation. Normal instrument readings are: Engine oil press.: 60 to 70 PSI at 1800 RPM Tachometer RPM low idle 1000 RPM governed speed 1800 Water temperature 170–190°F. Oil temperature 170–220°F. Air pressure 80–105 PSI Fuel pressure 25 PSI minimum at 1800 RPM	

Table 3-1. Preventive Maintenance Checks and Services — Continued.

Item number	Interval						B — Before operation	W — Weekly	M — Monthly
	Operator				Org.		D — During operation	A — After operation	Q — Quarterly
	Daily			W	M	Q	Item to be inspected	Procedure	Reference
	B	D	A						
15					X	X	Engine assembly	Check fuel injection pump timing dimensions.	Para 6-20
					X	X		Check fuel rack setting.	Para 6-17
						X		Check valve clearances.	Para 3-117
		X			X	X		Check for even running and exhaust smoke for improper combustion.	Table 3-2
					X	X		Check engine mounting.	
					X	X		Check cylinder head bolt torque.	Table 5-4
					X	X		Check and clean fuel injection valves.	Para 3-94
16		X		X	X	X	Tires	Check inflation, for missing valve caps, and wear.	Para 3-121
17					X	X	Brake system	Check lining wear. Check for cracks or defects.	Para 8-4
						X		Make brake adjustment.	Para 3-125
	X			X	X	X		Check all air lines and connections.	Para 3-128
				X	X	X		Check parking brake operation and adjustment.	Para 3-129
					X	X		Lubricate parking brake mechanism.	LO 5-4310-338-12
18					X	X	Axles and steering	Check tierod adjustment, and axles for damage.	Fig. 3-123
					X	X		Lubricate steering components.	Fig. 3-14
19				X	X	X	Springs	Check for broken mounting hardware or spring leafs.	
					X	X		Lubricate springs.	Fig. 3-15, LO 5-4310-338-12
20						X	Wheel bearings	Remove, clean, inspect, reinstall, and pack bearings.	Fig. 3-11, LO 5-4310-338-12
21	X		X	X	X	X	Lighting system	Check operation of all taillights, stoplights, clearance lights, and panel lights.	Fig. 3-7
22	X			X	X	X	Cold weather starting aid	Weigh cylinder. Full cylinder weighs 37 ounces. Fuel consumption is 5CC per shot.	Para 2-20 Fig. 3-19
				X	X	X		Clean orifice.	Fig. 3-19
	X		X	X	X	X		Check cylinder for hand tightness.	

3-8. Engine Crankcase Service

Service engine crankcase as shown in figure 3-2.


OIL LEVEL DIPSTICK
CRANKCASE DRAIN PLUG
OIL FILL CAP
ME 4310-338-15/3-2

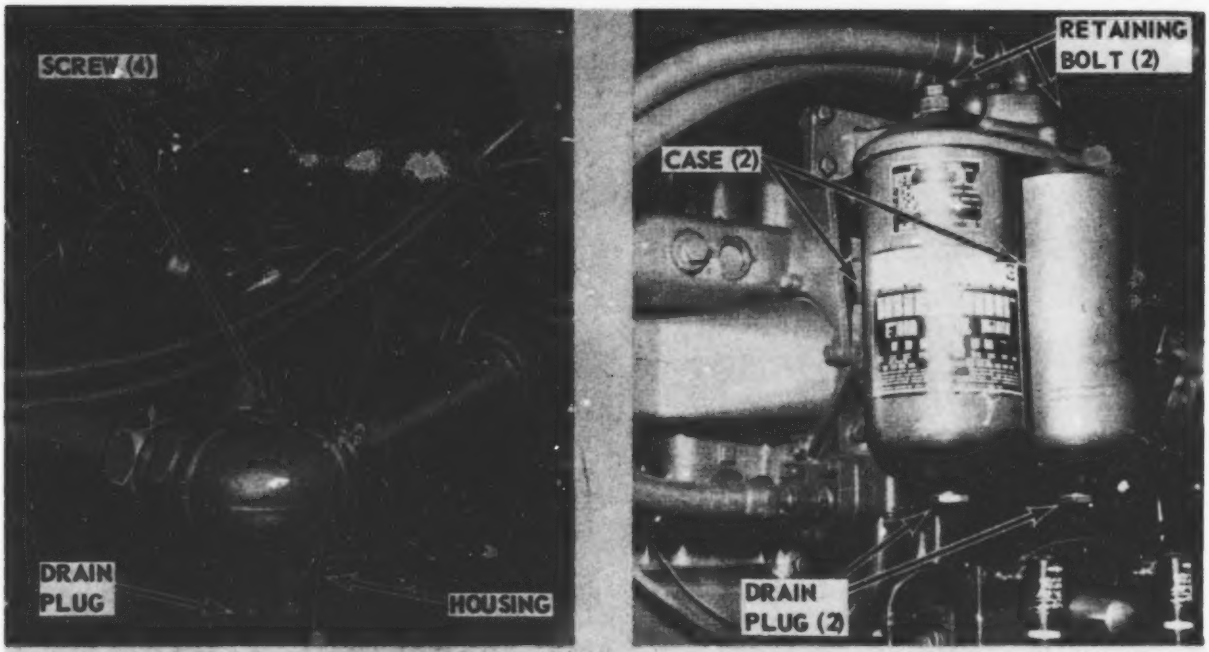
STEP 1. CHECK ENGINE OIL LEVEL GAGE FOR PROPER CRANKCASE OIL LEVEL.

STEP 2. FILL TO PROPER LEVEL. REFERENCE LUBRICATION ORDER LO 5-4310-338-12.

Figure 3-2. Engine crankcase service.

3-9. Oil Filter Service

Service engine and compressor oil filters and replace elements as shown in figure 3-3.



ME 4310-338-15/3-3

NOTE

STOP ENGINE BEFORE SERVICING COMPRESSOR OIL FILTER. SERVICE AFTER EACH 100 HOURS OF OPERATION.

STEP 1. REMOVE DRAIN PLUG AND DRAIN OIL FROM HOUSING. REPLACE DRAIN PLUG.

STEP 2. REMOVE SCREWS. REMOVE HOUSING AND ELEMENT.

STEP 3. CLEAN HOUSING AND HEAD ASSEMBLY USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 4. INSTALL A NEW ELEMENT AND GASKET. INSTALL HOUSING AND SECURE WITH SCREWS.

A COMPRESSOR OIL FILTER

NOTE

STOP ENGINE BEFORE SERVICING ENGINE OIL FILTER ASSEMBLY. SERVICE AFTER EACH 100 HOURS OF OPERATION.

STEP 1. REMOVE DRAIN PLUGS AND DRAIN OIL FROM CASES. REPLACE DRAIN PLUGS.

STEP 2. UNSCREW CASE RETAINING BOLT AND REMOVE CASES AND ELEMENTS.

STEP 3. CLEAN CASES AND HEAD ASSEMBLY USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

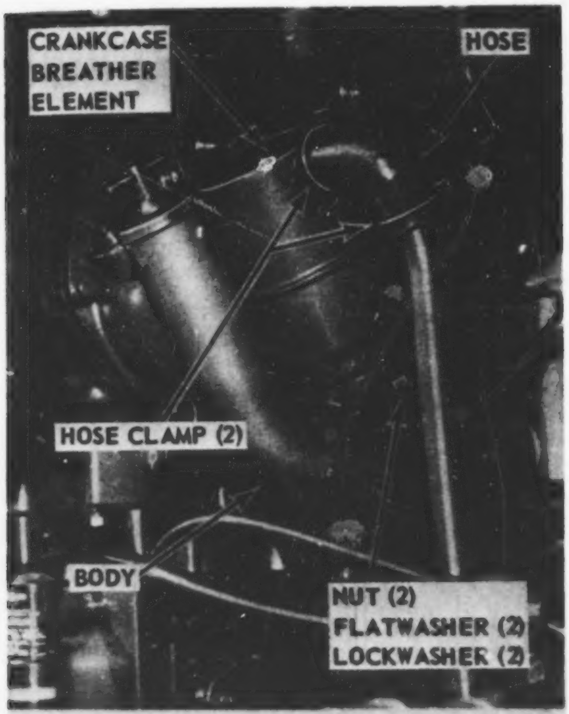
STEP 4. INSTALL NEW ELEMENTS AND GASKETS. INSTALL CASES AND RETAINING BOLTS. TIGHTEN BOLTS.

B ENGINE OIL FILTER

Figure 3-3. Oil filter service.

3-10. Engine Crankcase Breather Service

Service engine crankcase breather and replace filter as shown in figure 3-4.


CRANKCASE BREATHER ELEMENT
HOSE
HOSE CLAMP (2)
BODY
NUT (2)
FLATWASHER (2)
LOCKWASHER (2)

ME 4310-338-15/3-4

STEP 1. LOOSEN HOSE CLAMP AND DISCONNECT HOSE FROM BREATHER ELEMENT.

STEP 2. REMOVE NUTS AND LOCKWASHERS. REMOVE BREATHER ELEMENT AND GASKET.

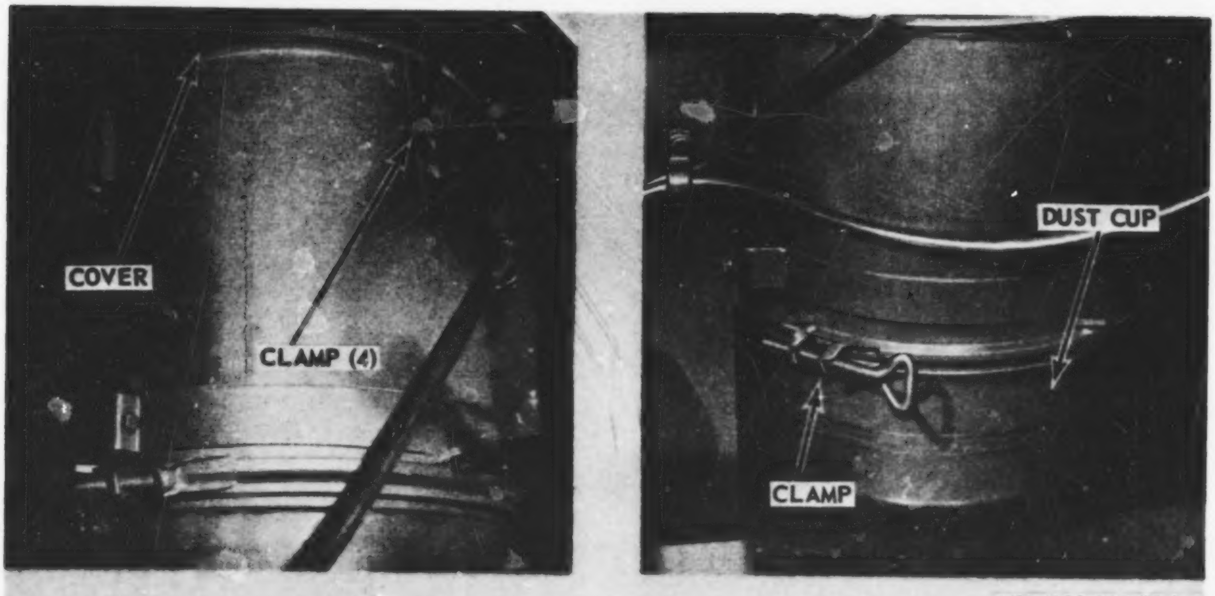
STEP 3. CLEAN BODY USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 4. INSTALL A NEW BREATHER ELEMENT AND GASKET. SECURE WITH NUTS AND LOCKWASHERS.

Figure 3-4. Engine crankcase breather service.

3-11. Air Cleaner Service

Service engine and compressor air cleaners and replace elements as shown in figure 3-5.



ME 4310-338-15/3-5

NOTE

THE FOLLOWING SERVICE INSTRUCTIONS ARE APPLICABLE FOR BOTH AIR CLEANERS.

STEP 1. UNFASTEN CLAMPS FROM COVER. REMOVE COVER AND GASKET FROM AIR CLEANER BODY.

STEP 2. REMOVE SCREW, GASKETS, AND COVER FROM TOP OF ELEMENT. LIFT ELEMENT AND LOWER GASKET OUT OF BODY. (SEE FIG. 3-57.)

STEP 3. LOOSEN BOTTOM CLAMP AND REMOVE DUST CUP AND GASKET.

STEP 4. CLEAN INSIDE BODY AND DUST CUP USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680. WASH AND INSPECT ELEMENT OR REPLACE (PARA 3-79). REPLACE ALL GASKETS.

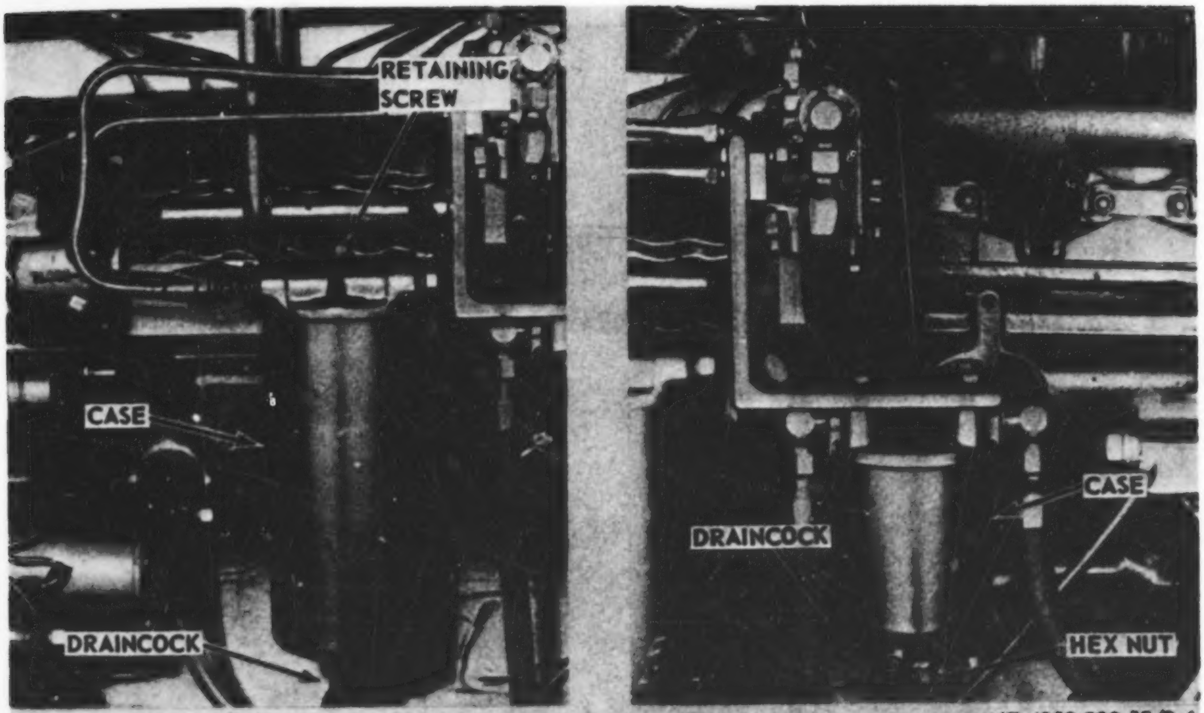
STEP 5. REASSEMBLE AIR CLEANER. BE SURE THAT ELEMENT IS SEATED PROPERLY, THAT GASKETS ARE NOT TWISTED, AND THAT DUST CUP AND BOTH COVERS ARE FIRMLY SECURED.

STEP 6. RESET AIR CLEANER RESTRICTION INDICATOR ON INSTRUMENT PANEL (FIG. 2-2).

Figure 3-5. Air cleaner service.

3-12. Fuel Filter Service

Service fuel filters and replace or clean elements as shown in figure 3-6.



ME 4310-338-15/3-6

A FINAL FUEL FILTER

STEP 1. OPEN DRAINCOCK AND DRAIN ALL FUEL OUT OF FILTER CASE. CLOSE DRAINCOCK.

STEP 2. REMOVE RETAINING SCREW. REMOVE CASE AND ELEMENT.

STEP 3. CLEAN CASE AND HEAD ASSEMBLY USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 4. INSTALL A NEW ELEMENT AND GASKET. INSTALL CASE AND SECURE WITH RETAINING SCREW.

B PRIMARY FUEL FILTER

STEP 1. OPEN DRAINCOCK AND DRAIN ALL FUEL FROM CASE. CLOSE DRAINCOCK.

STEP 2. REMOVE HEX NUT. REMOVE CASE AND ELEMENT.

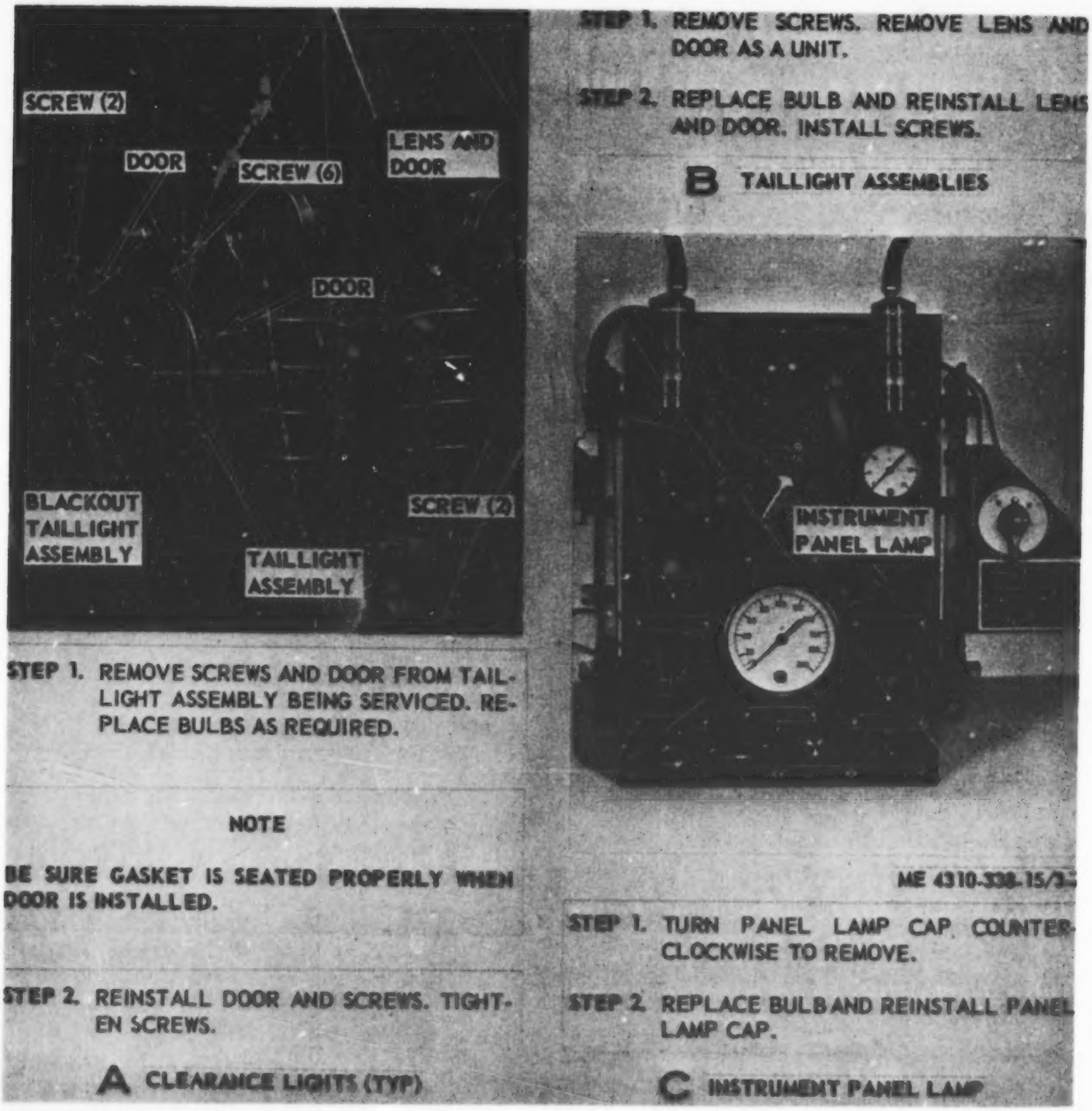
STEP 3. CLEAN CASE, HEAD, AND ELEMENT USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 4. REPLACE GASKET. INSTALL ELEMENT AND CASE AND SECURE WITH HEX NUT.

Figure 3-6. Fuel filter service.

3-13. Lamp Replacement

Replace control panel, taillight, and clearance lamps as shown in figure 3-7.


SCREW (2)
DOOR
SCREW (6)
LENS AND DOOR
DOOR
BLACKOUT TAILLIGHT ASSEMBLY
SCREW (2)
TAILLIGHT ASSEMBLY
INSTRUMENT PANEL LAMP
ME 4310-338-15/3

STEP 1. REMOVE SCREWS AND DOOR FROM TAILLIGHT ASSEMBLY BEING SERVICED. REPLACE BULBS AS REQUIRED.

NOTE

BE SURE GASKET IS SEATED PROPERLY WHEN DOOR IS INSTALLED.

STEP 2. REINSTALL DOOR AND SCREWS. TIGHTEN SCREWS.

A CLEARANCE LIGHTS (TYP)

STEP 1. REMOVE SCREWS. REMOVE LENS AND DOOR AS A UNIT.

STEP 2. REPLACE BULB AND REINSTALL LENS AND DOOR. INSTALL SCREWS.

B TAILLIGHT ASSEMBLIES

STEP 1. TURN PANEL LAMP CAP COUNTERCLOCKWISE TO REMOVE.

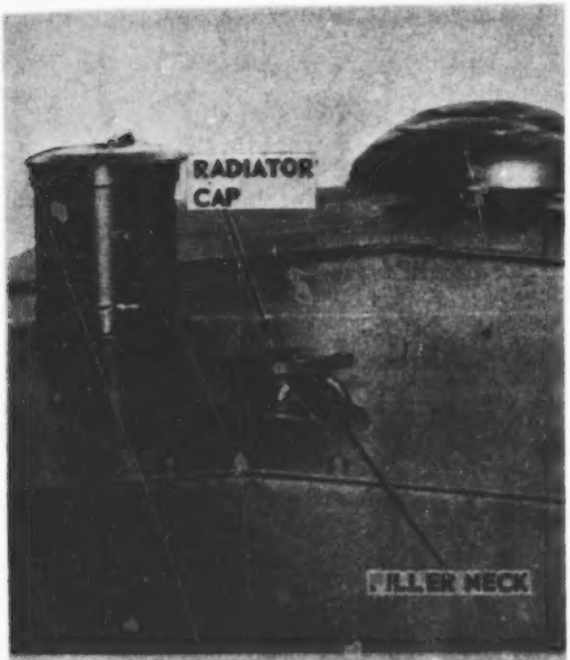
STEP 2. REPLACE BULB AND REINSTALL PANEL LAMP CAP.

C INSTRUMENT PANEL LAMP

Figure 3-7. Lamp replacement.

3-14. Engine Radiator Service

Service engine radiator and replace radiator cap as shown in figure 3-8.



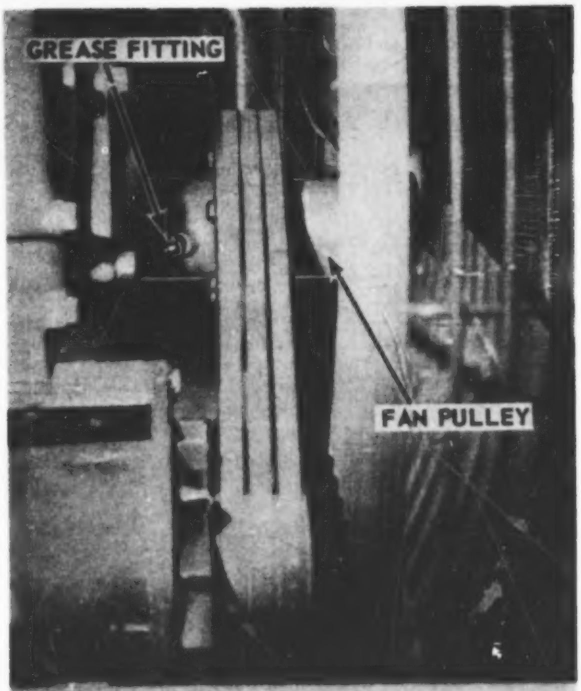
ME 4310-338-15/3-8

CHECK ENGINE COOLANT LEVEL. PROPER LEVEL IS TWO INCHES BELOW FILLER NECK.

Figure 3-8. Engine radiator service.

3-15. Fan Drive Group Service

Service fan drive group as shown in figure 3-9.



ME 4310-338-15/3-9

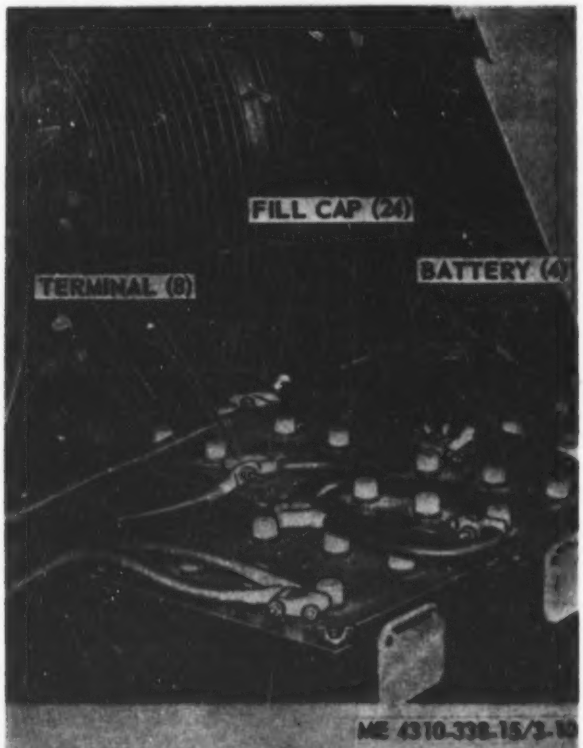
STEP 1. WIPE GREASE FITTING CLEAN USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 2. LUBRICATE FAN PULLEY. REFERENCE LUBRICATION ORDER LO 5-4310-338-12.

Figure 3-9. Fan drive group service.

3-16. Battery Service

Service batteries as shown in figure 3-10.


FILL CAP (24)
BATTERY (4)
TERMINAL (8)
ME 4310-338-15/3-10

STEP 1. REMOVE FILL CAP (24). CLEAN VENT HOLE.

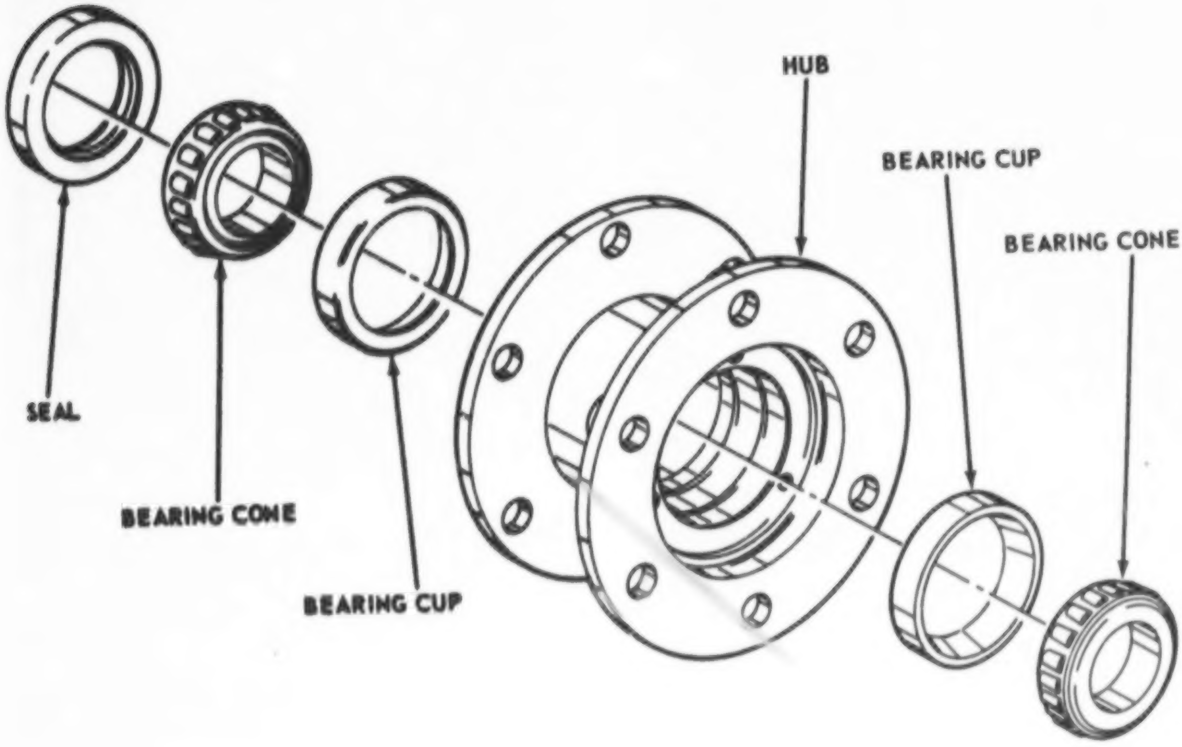
STEP 2. FILL CELLS WITH DISTILLED WATER TO 3/8-INCH ABOVE PLATES.

STEP 3. CLEAN TERMINALS AND COAT LIGHTLY WITH LUBRICANT. CLEAN BATTERIES WITH A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680. INSPECT FOR DAMAGE.

Figure 3-10. Battery service.

3-17. Wheel Bearing Service

Service front and rear wheel bearings as shown in figure 3-11.



ME 4310-338-15/3.11

STEP 1. REMOVE WHEEL ASSEMBLY (PARA 3-121).

STEP 2. REMOVE HUB AND BRAKE DRUM ASSEMBLY (PARA 3-122).

STEP 3. REMOVE BEARING CONES FROM HUB (PARA 3-122).

STEP 4. CLEAN BEARINGS USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680. WIPE GREASE SEAL CLEAN. INSPECT PARTS FOR DEFECTS.

STEP 5. REASSEMBLE HUB AND LUBRICATE BEARINGS. REFERENCE LUBRICATION ORDER LO 5-4310-338-12.

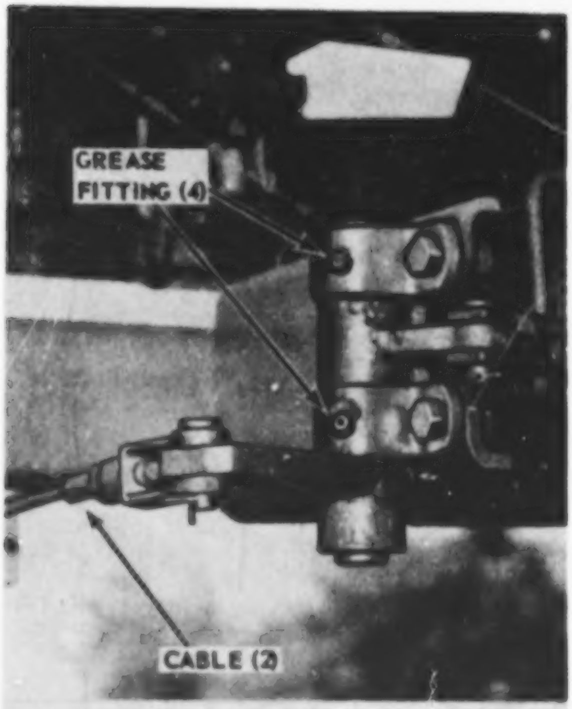
STEP 6. INSTALL HUB AND BRAKE DRUM ASSEMBLY (PARA 3-122).

STEP 7. INSTALL WHEEL ASSEMBLY (PARA 3-121).

Figure 3-11. Wheel bearing service.

3-18. Parking Brake Service

Service parking brake as shown in figure 3-12.



ME 4310-338-15/3-12

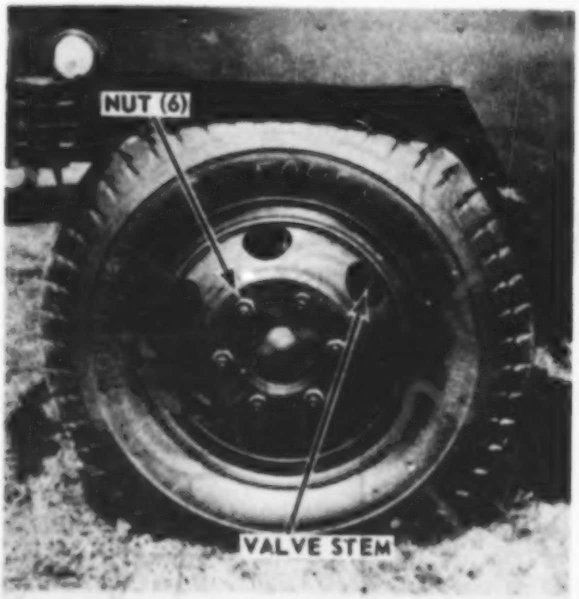
STEP 1. WIPE GREASE FITTINGS AND CABLES CLEAN USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 2. LUBRICATE CABLES AND GREASE FITTINGS. REFERENCE LO 5-4310-338-12.

Figure 3-12. Parking brake service.

3-19. Tire and Tube Service

Service tires and tubes as shown in figure 3-13.



ME 4310-338-15/3-13

STEP 1. CHECK FOR AND TIGHTEN ANY LOOSE NUTS.

NOTE

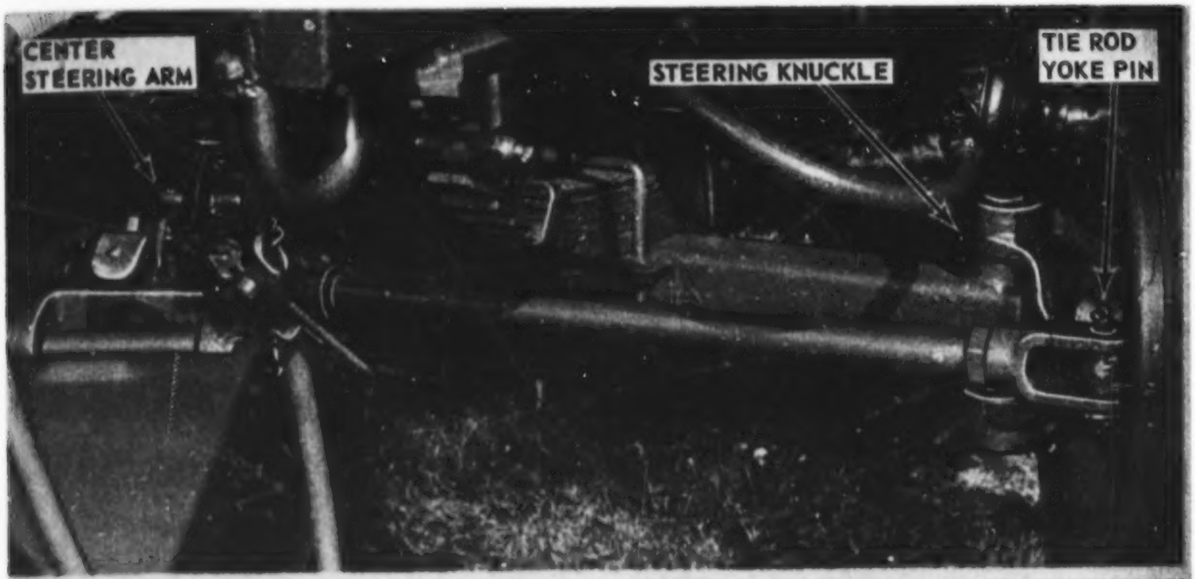
DO NOT CHECK AIR PRESSURE JUST AFTER UNIT HAS BEEN TOWED FOR A LONG DISTANCE AND TIRES ARE WARM.

STEP 2. CHECK EACH TIRE FOR PROPER INFLATION. AIR PRESSURE IN EACH TIRE SHOULD BE 45 PSI.

Figure 3-13. Tire and tube service.

3-20. Steering Assembly Service

Service steering assembly as shown in figure 3-14.


CENTER STEERING ARM
STEERING KNUCKLE
TIE ROD YOKE PIN

ME 4310-338-15/3-14

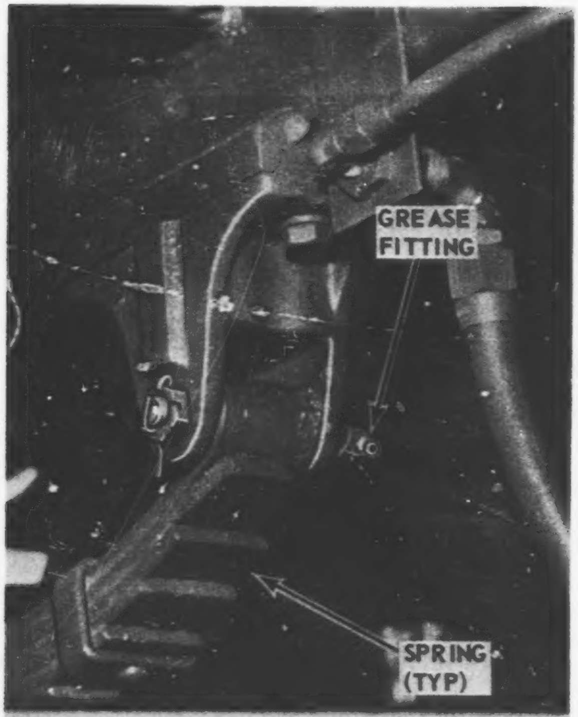
STEP 1. WIPE GREASE FITTINGS CLEAN USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 2. LUBRICATE TIE ROD YOKE PINS (4 FITTINGS), STEERING KNUCKLES (4 FITTINGS), AND CENTER STEERING ARM (2 FITTINGS). REFERENCE LUBRICATION ORDER LO 5-4310-338-12.

Figure 3-14. Steering assembly service.

3-21. Spring Service

Service springs as shown in figure 3-15.



ME 4310-338-15/3-15

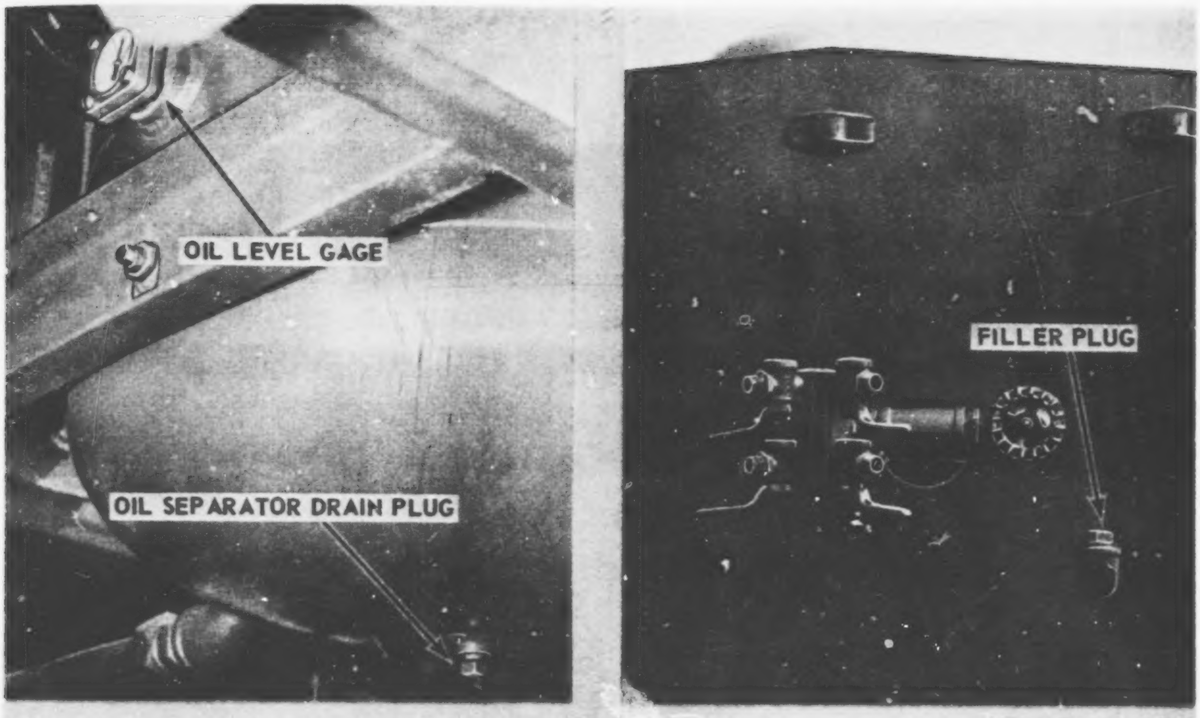
STEP 1. WIPE GREASE FITTING CLEAN USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

STEP 2. LUBRICATE SPRING. REFERENCE LO 5-4310-338-12.

Figure 3-15. Spring service.

3-22. Oil Separator Service

Service oil separator as shown in figure 3-16.


OIL LEVEL GAGE
OIL SEPARATOR DRAIN PLUG
FILLER PLUG

ME 4310-338-15/3-16

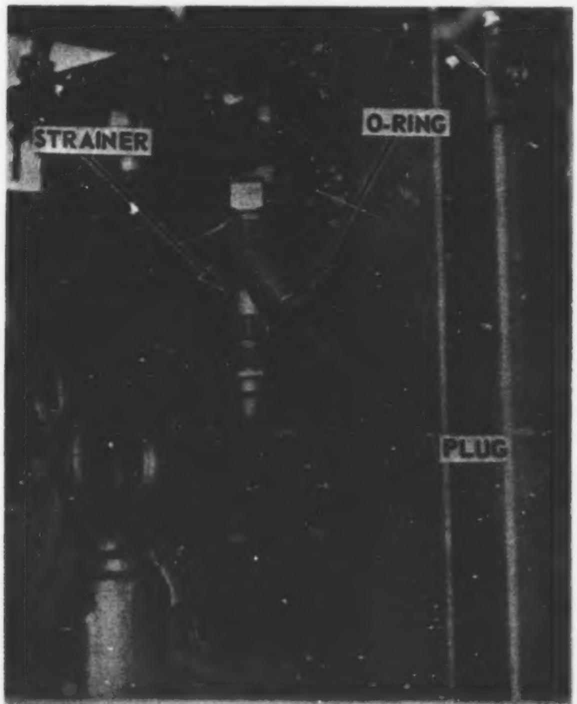
STEP 1. CHECK OIL LEVEL GAGE FOR PROPER COMPRESSOR OIL LEVEL. FILL TO PROPER LEVEL. REFERENCE LUBRICATION ORDER LO5-4310-338-12.

STEP 2. CLEAN OIL SEPARATOR OIL LEVEL GAGE AND FILLER WITH A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680.

Figure 3-16. Oil separator service.

3-23. Oil Return Line Strainer Service

Service oil return line strainer as shown in figure 3-17.



ME 4310-339-15/3-17

STEP 1. REMOVE PLUG AND O-RING. REMOVE STRAINER ELEMENT.

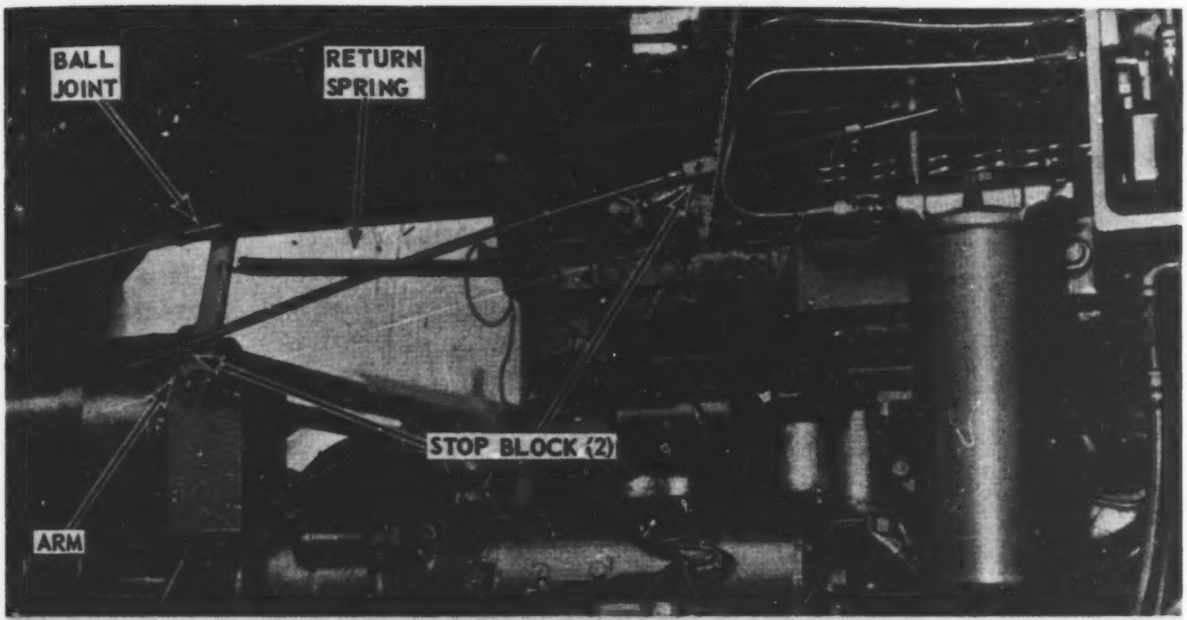
STEP 2. CLEAN ELEMENT USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680. INSPECT STRAINER AND O-RING.

STEP 3. INSTALL STRAINER, O-RING, AND PLUG.

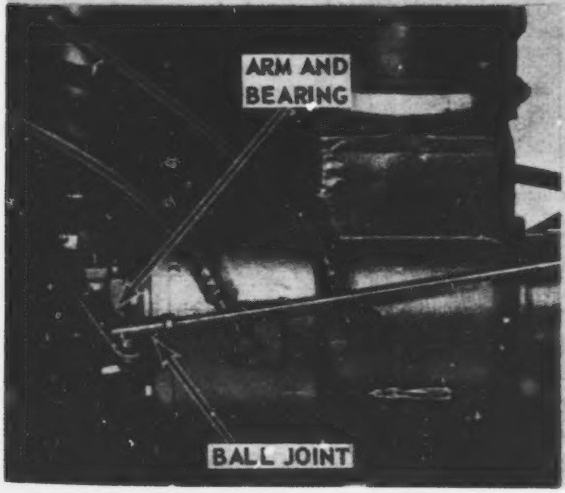
Figure 3-17. Oil return line strainer service.

3-24. Speed Control Linkage Service

Service speec control linkage as shown in figure 3-18.


BALL JOINT
RETURN SPRING
STOP BLOCK (2)
ARM

ME 4310-338-15/3-18


ARM AND BEARING
BALL JOINT

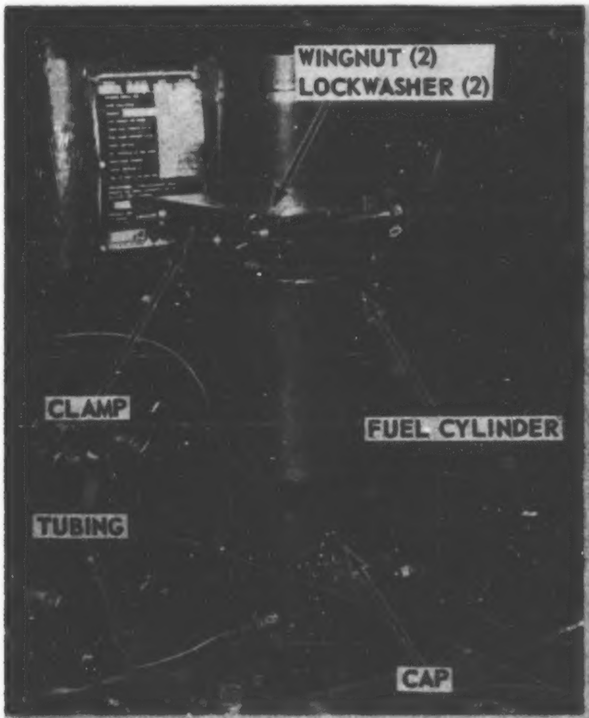
STEP 1. WIPE CLEAN ALL ARMS, PIVOT POINTS, AND RODS USING A CLEANING SOLVENT THAT IS IN ACCORDANCE WITH FEDERAL SPECIFICATION P-D-680. DRY THOROUGHLY.

STEP 2. LUBRICATE ARMS, BALL JOINTS, STOP BLOCKS, SPRING, AND OTHER PIVOTAL POINTS. REFERENCE LUBRICATION ORDER LO 5-4310-338-12.

Figure 3-18. Speed Control Linkage Service.

3-25. Cold Weather Starting Aid Service

Service cold weather starting aid as shown in figure 3-19.



ME 4310-338-15/3-19

WARNING

DO NOT PUNCTURE OR MISHANDLE FUEL CYLINDER. THE CYLINDER CONTAINS AN ETHER BASE MIXTURE WHICH IS EXTREMELY TOXIC, VOLATILE, AND COMBUSTIBLE.

STEP 1. REMOVE WINGNUTS, LOCKWASHERS, AND CLAMP.

STEP 2. UNSCREW AND REMOVE FUEL CYLINDER FROM ACTUATING VALVE. COVER VALVE OPENING WITH CAP UNTIL READY TO INSTALL NEW FUEL CYLINDER.

STEP 3. REMOVE ACTUATING VALVE CAP AND INSTALL NEW FUEL CYLINDER TO VALVE.

STEP 4. INSTALL CLAMP, LOCKWASHERS, AND WINGNUTS.

STEP 5. DISCONNECT TUBING LINE FROM ACTUATING VALVE AND ENGINE INTAKE MANIFOLD. BLOW OUT LINE WITH COMPRESSED AIR THROUGH ORIFICE END ONLY.

STEP 6. CONNECT TUBING LINE TO ACTUATING VALVE AND OPERATE ACTUATING LEVER. CHECK ORIFICE END FOR FOGGING DISCHARGE OF FUEL.

STEP 7. CONNECT TUBING LINE TO ENGINE INTAKE MANIFOLD.

Figure 3-19. Cold weather starting aid service.

Section V. TROUBLESHOOTING

3-26. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the Model IM600RPV Rotary Air Compressor. Malfunctions which may occur are listed in Table 3-2. Each malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described next to the probable cause. References to applicable procedural paragraphs or illustrations are also included in the corrective action column. Any trouble encountered that is beyond the scope of organizational maintenance shall be reported to Direct Support, General Support, or Depot Maintenance personnel as indicated by the Maintenance Allocation Chart, Appendix C.

Section VI. FIELD EXPEDIENT REPAIRS

3-27. General

Because of the nature of the air compressor unit, there are no field expedient repairs for this equipment. Any such repairs could result in serious harm to the equipment.

Table 3-2. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Engine will not turn over.	*a.* **Weak or dead batteries.**	*a.* Charge or replace batteries (para 3-106).
	b. **Battery cable connections loose or terminals corroded.**	*b.* Clean terminals and tighten connections.
	c. **HEAT-START switch defective.**	*c.* Replace HEAT-START switch (para 3-60).
	d. **Starting motor defective.**	*d.* Replace starting motor (para 3-105).
	e. **Other causes**	*e.* Refer other causes to Direct Support, General Support or Depot Level maintenance personnel.
2. Engine turns over but will not start or is hard to start.	*a.* **Engine stop control is in stop position.**	*a.* Place control in operating position.
	b. **Fuel tanks empty.**	*b.* Refill fuel tanks.
	c. **Water or dirt in fuel system.**	*c.* Drain fuel tanks. Fill tanks with uncontaminated fuel. Clean fuel lines. Service fuel filters (fig. 3-6).
	d. **One or both fuel filters are clogged.**	*d.* Service fuel filters (fig. 3-6).
	e. **Improper fuel grade.**	*e.* Drain fuel tanks. Fill tanks with proper grade of fuel (para 1-4).
	f. **Fuel transfer pump defective.**	*f.* Replace fuel transfer pump (para 3-95).
	g. **Air in fuel system.**	*g.* Purge fuel lines using hand priming pump. Tighten connections.
	h. **Turbocharger defective.**	*h.* Replace turbocharger (para 3-115).
	i. **Engine air cleaner dirty or clogged.**	*i.* Service air cleaner (fig. 3-5).
	j. **Shutoff solenoid sticking.**	*j.* Replace shutoff solenoid (para 3-58).
	k. **Fuel bypass valve sticking open.**	*k.* Replace fuel bypass valve (para 3-99).
	l. **Valve clearances incorrect.**	*l.* Adjust valve clearances (para 3-117).
	m. **Other causes**	*m.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
3. Engine misses or runs erratically.	*a.* **Engine too cold to run loaded compressor.**	*a.* Do not use any air from compressor until engine runs smoothly.
	b. **Water in fuel system.**	*b.* Drain fuel system. Fill with clean, uncontaminated fuel. Service fuel filters (fig. 3-6).
	c. **Air in fuel system.**	*c.* Purge lines using hand priming pump. Tighten connections.
	d. **Fuel transfer pump defective.**	*d.* Replace fuel transfer pump (para 3-95).
	e. **Fuel lines leaking or cracked.**	*e.* Replace fuel lines (para 3-100).
	f. **Valve clearances incorrect.**	*f.* Adjust valve clearances (para 3-117).
	g. **Defective fuel injection nozzle or fuel injection pump.**	*g.* Run engine at speed where defect is most noticeable. Momentarily loosen fuel line nut on each injection pump, one at a time, to cut out that cylinder. If one is found where loosening nut makes no difference in irregular operation, replace nozzle or pump for that cylinder (para 3-94 and 3-93).
	h. **Fuel bypass valve defective.**	*h.* Replace fuel bypass valve (para 3-99).
	i. **Other causes**	*i.* Refer other causes to Direct Support, General Support and Depot level maintenance personnel.
4. Engine lacks power.	*a.* **Fuel filters dirty or clogged.**	*a.* Service fuel filters (fig. 3-6).
	b. **Engine air cleaner clogged.**	*b.* Service air cleaner (fig. 3-5).
	c. **Valve clearances incorrect.**	*c.* Adjust valve clearances (para 3-117).
	d. **Air in fuel system.**	*d.* Purge lines using hand priming pump. Tighten connections.
	e. **Defective fuel injection nozzle or fuel injection pump.**	*e.* Run engine at speed where defect is most noticeable. Momentarily loosen fuel line nut on each injection pump, one at a time, to cut out that cylinder. If one is found where loosening nut makes no difference in improper operation, replace nozzle or pump for that cylinder (para 3-94 and 3-93).
	f. **Fuel contaminated or of poor quality.**	*f.* Drain fuel system. Fill with clean, uncontaminated fuel. Service fuel filters (fig. 3-6).
	g. **Fuel transfer pump defective.**	*g.* Replace fuel transfer pump (para 3-95).

Table 3-2. Troubleshooting — Continued.

Malfunction	Probable cause	Corrective action
	h. Turbocharger carboned or otherwise dragging.	*h.* Replace turbocharger (para 3-115).
	i. Fuel bypass valve defective.	*i.* Replace fuel bypass valve (para 3-99).
	j. Speed control linkage out of adjustment.	*j.* Adjust speed control linkage (fig. 3-69).
	k. Other causes	*k.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
5. Engine knocks, develops excessive noise, or vibration.	*a.* Engine oil level low.	*a.* Fill crankcase in accordance with current lubrication order (LO) 5-4310-338-12
	b. Improper fuel grade.	*b.* Drain fuel tanks. Fill tanks with proper grade of fuel (para 1-4).
	c. Valve clearances incorrect.	*c.* Adjust valve clearances (para 3-117).
	d. Low engine operating temperature.	*d.* Replace water temperature regulator (para 3-75).
	e. Engine mounting bolts loose.	*e.* Tighten engine mounting bolts (see torque data, Table 5-4).
	f. Compressor vibrating. .	*f.* See Noisy Compressor Operation, trouble number 20.
	g. Loose pulley and damper.	*g.* Tighten pulley and damper.
	h. Fan blade unbalanced.	*h.* Loosen or remove fan belts. Operate engine for short duration at affected speed range. If vibration is not present, replace fan assembly (para 3-74).
	i. Defective fuel injection pump or nozzle.	*i.* Run engine at speed where defect is most noticeable. Momentarily loosen fuel line nut on each injection pump, one at a time, to cut out that cylinder. If one is found where loosening nut makes no difference in improper operation, replace nozzle or pump for that cylinder (para 3-94 and 3-93).
	j. Other causes	*j.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
6. Engine stops suddenly.	*a.* Out of fuel.	*a.* Fill fuel tanks with proper grade of fuel (para 1-4).
	b. Fuel filters dirty or clogged.	*b.* Service fuel filters (fig. 3-6).
	c. Water or dirt in fuel system.	*c.* Drain fuel tanks. Fill tanks with uncontaminated fuel. Clean fuel lines. Service fuel filters (fig. 3-6).
	d. Engine overheating (safety switch shutoff).	*d.* Check engine coolant level. Inspect radiator and hoses for leaks or obstructions. Check drive belt adjustment (fig. 3-47).
	e. Low oil pressure (safety switch shutoff).	*e.* Check crankcase oil level. Fill in accordance with current Lubrication Order (LO) 5-4310-338-12
	f. Overspeed governor switch defective or out of adjustment.	*f.* Adjust or replace overspeed governor switch (para 3-67).
	g. Air in fuel system.	*g.* Purge lines using hand priming pump. Tighten connections.
	h. Shutoff solenoid defective.	*h.* Replace shutoff solenoid (para 3-58).
	i. Air compressor overheating (safety switch shutoff).	*i.* Low compressor oil level. Fill in accordance with current Lubrication Order (LO) 5-4310-338-12. Dirty compressor oil filter element. Change element (fig. 3-3). Dust or dirt collected on oil cooler core external surface. Blow off all dirt and dust.
	j. Other causes	*j.* Refer other causes to Direct Support, General Support and Depot level maintenance personnel.
7. Engine has low or no oil pressure.	*a.* Oil level in crankcase low.	*a.* Fill crankcase in accordance with current Lubrication Order (LO) 5-4310-338-12

Table 3-2. Troubleshooting — Continued.

Malfunction	Probable cause	Corrective action
	b. Improper lubricant.	*b.* Drain crankcase. Fill with proper lubricant in accordance with current Lubrication Order (LO) 5-4310-338-12.
	c. Oil pressure gage defective.	*c.* Replace oil pressure gage (para 3-46).
	d. Other causes	*d.* Refer other causes to Direct Support, General Support and Depot level maintenance personnel.
8. Engine overheats.	*a.* Coolant level low.	*a.* Fill radiator.
	b. Dust or dirt collected on radiator core external surfaces.	*b.* Blow off all dust and dirt.
	c. Oil supply in crankcase low.	*c.* Fill crankcase in accordance with current Lubrication Order (LO) 5-4310-338-12
	d. Water pump defective.	*d.* Replace water pump (para 3-76).
	e. Water temperature regulator defective.	*e.* Replace water temperature regulator (para 3-75).
	f. Water temperature gage defective.	*f.* Replace water temperature gage (para 3-53).
	g. Fan drive belts slipping or broken.	*g.* Replace or adjust drive belts (para 3-72).
	h. Radiator hoses collapsed or deteriorated.	*h.* Repair or replace radiator hoses (para 3-71).
	i. Radiator blocked.	*i.* Flush out radiator to remove blockage.
	j. Other causes	*j.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
9. Engine exhaust excessively black or gray.	*a.* Air cleaner clogged.	*a.* Service air cleaner (fig. 3-5).
	b. Turbocharger carboned or defective.	*b.* Replace turbocharger (para 3-115).
	c. Fuel injection nozzle plugged or leaking.	*c.* Replace fuel injection valve nozzle (para 3-94).
	d. Other causes	*d.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
10. Engine exhaust excessively white or blue.	*a.* Crankcase oil level too high.	*a.* Avoid overfilling. Determine cause and drain excess oil.
	b. Defective fuel injection nozzle or fuel injection pump.	*b.* Run engine at speed where defect is most noticeable. Momentarily loosen fuel line nut on each injection pump, one at a time, to cut out that cylinder. If one is found where loosening nut makes no difference in irregular operation, replace nozzle or pump for that cylinder (para 3-94 and 3-93).
	c. Valve clearances incorrect.	*c.* Adjust valve clearances (para 3-117).
	d. Improper fuel grade.	*d.* Drain fuel tanks. Fill tanks with proper grade of fuel (para 1-4).
	e. Engine operating temperature too low.	*e.* Replace water temperature regulator (para 3-75).
	f. Fuel transfer pump defective.	*f.* Replace fuel transfer pump (para 3-95).
	g. Fuel bypass valve defective.	*g.* Replace fuel bypass valve (para 3-99).
	h. Air in fuel system.	*h.* Purge lines using hand priming pump. Tighten connections.
	i. Fuel filters dirty or clogged.	*i.* Service fuel filters (fig. 3-6).
	j. Other causes	*j.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
11. Excessive engine oil consumption.	*a.* High crankcase pressure.	*a.* Service crankcase breather (fig. 3-4).
	b. External oil leaks.	*b.* Inspect for visible evidence of leaks and repair accordingly.
	c. Crankcase oil level too high.	*c.* Avoid overfilling. Determine cause and drain excess oil.
	d. Other causes	*d.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
12. Engine fails to stop.	*a.* Engine stop cable broken or out of adjustment.	*a.* Adjust or replace engine stop cable (para 3-59).
	b. Other causes	*b.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.

Table 3-2. Troubleshooting — Continued.

Malfunction	Probable cause	Corrective action
13. Excessive fuel consumption.	*a.* Leak in fuel system.	*a.* Pressurize fuel tanks to 5 PSI maximum. Watch for evidence of leaks. Inspect all external lines and connections. Engine internal leaks will probably be accompanied by low engine oil pressure and increased level in oil sump.
	b. Fuel grade improper.	*b.* Drain fuel tanks. Fill tanks with proper grade of fuel (para 1-4).
	c. Fuel and combustion knock.	*c.* See corrective actions for Misfiring and Low Power.
	d. Other causes	*d.* Refer other causes to Direct Support, General Support and Depot level maintenance personnel.
14. Engine stalls at low speed.	*a.* Air in fuel system.	*a.* Purge lines using hand priming pump. Tighten connections.
	b. Fuel bypass valve defective.	*b.* Replace fuel bypass valve (para 3-99).
	c. Fuel filters dirty or clogged.	*c.* Service fuel filters (fig. 3-6).
	d. Fuel transfer pump defective.	*d.* Replace fuel transfer pump (para 3-95).
	e. Fuel injection nozzle defective.	*e.* Replace fuel injection valve nozzle (para 3-94).
	f. Other causes	*f.* Refer other causes to Direct Support, General Support and Depot level maintenance personnel.
15. Valve train clicking noise.	*a.* Valve clearances incorrect.	*a.* Adjust valve clearances (para 3-117).
	b. Insufficient lubricant circulation.	*b.* Check lubrication in valve compartment. Should be very wet at high idle speed, but only damp at low idle. Oil passages should be cleaned, especially those leading to cylinder head.
	c. Engine oil level low.	*c.* Fill crankcase in accordance with current Lubrication Order (LO) 5-4310-338-12
	d Other causes	*d.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
16. Engine oil in coolant or coolant in engine oil.	*a.* Engine oil cooler defective.	*a.* Replace engine oil cooler (para 3-109).
	b. Other causes	*b.* Refer other causes to Direct Support, General Support and Depot level maintenance personnel.
17. Little rocker arm movement and excessive valve clearances.	*a.* Insufficient lubricant circulation.	*a.* Check lubrication in valve compartment. Should be very wet at high idle speed, but only damp at low idle. Oil passages should be cleaned, especially those leading to cylinder head.
	b. Other causes	*b.* Refer other causes to Direct Support, General Support and Depot level maintenance personnel.
18. Premature engine wear.	*a.* Engine air cleaner defective.	*a.* Replace engine air cleaner (para 3-113).
	b. Dirt in lubricating oil.	*b.* Locate and correct source of dirt entry. Change lubricating oil. Service oil filter (fig. 3-3).
	c. Other causes	*c.* Refer other causes to Direct Support, General Support and Depot level maintenance personnel.
19. Compressor overheats.	*a.* Dirty compressor oil filter element.	*a.* Service compressor oil filter (fig. 3-3).
	b. Dust or dirt collected on oil cooler core external surface.	*b.* Blow off all dirt and dust.
	c. Low compressor oil level.	*c.* Refill oil separator to proper level in accordance with current Lubrication Order (LO) 5-4310-338-12
	d. Faulty thermal bypass valve.	*d.* Replace thermal bypass valve (para 3-85).
	e. Other causes	*e.* Report other causes to Direct Support, General Support and Depot level maintenance personnel.

Table 3-2. Troubleshooting — Continued.

Malfunction	Probable cause	Corrective action
20. Noisy compressor operation.	*a.* Low compressor oil level.	*a.* Refill oil separator to proper level in accordance with current Lubrication Order (LO) 5-4310-338-12
	b. Air pressure regulator assembly defective.	*b.* Replace air pressure regulator assembly (para 3-89).
	c. Other causes	*c.* Report other causes to Direct and General Support maintenance personnel.
21. Compressor not operating to full capacity or pressure.	*a.* Air pressure regulator assembly defective or out of adjustment.	*a.* Adjust or replace air pressure regulator assembly (para 3-89).
	b. Leak in air hoses, piping, or connections.	*b.* Check all air hoses, piping and connections for leaks while unit is operating. Use soapy water solution on areas. Tighten or replace as required.
	c. Compressor air cleaner dirty or clogged.	*c.* Service air cleaner (fig. 3-5).
	d. Safety valve on oil separator leaking.	*d.* Replace safety valve (para 3-83).
	e. Other causes	*e.* Report other causes to Direct and General Support maintenance personnel.
22. Compressor fails to load or unload.	*a.* Dirt buildup on intake-unloader valve seat.	*a.* Clean valve seat.
	b. Unloading pressure too high or too low.	*b.* Adjust air pressure regulator assembly (fig. 3-71).
	c. Air hose between intake-unloader and air pressure regulator assembly damaged or leaking.	*c.* Replace air hose (para 3-81).
	d. Other causes	*d.* Refer other causes to Direct and General support maintenance personnel.
23. Compressor unloads but engine will not idle.	*a.* Speed control linkage defective.	*a.* Replace speed control linkage (para 3-88).
	b. Other causes	*b.* Refer other causes to Direct and General support maintenance.
24. Condensate and/or emulsion in oil separator.	*a.* Unusually low oil temperature and high humidity.	*a.* If this is a climatic condition, replace compressor oil with a non-detergent oil. Refer to current Lubrication Order (LO) 5-4310-338-12
	b. Faulty thermal bypass valve.	*b.* Replace thermal bypass valve (para 3-85).
	c. Other causes	*c.* Refer other causes to Direct and General Support maintenance personnel.
25. Excessive compressor oil consumption.	*a.* Compressor oil system overfilled.	*a.* Drain to proper oil level.
	b. Other causes	*b.* Refer other causes to Direct and General Support maintenance personnel.
26. Compressor unit hunts.	*a.* Air pressure regulator assembly defective.	*a.* Replace air pressure regulator assembly (para 3-89).
	b. Other causes	*b.* Refer other causes to Direct and General Support maintenance personnel.
27. Ammeter indicates low or no charging rate when batteries are low or discharged.	*a.* Defective or loose wiring in charging circuit.	*a.* Repair or replace as required.
	b. Ammeter defective.	*b.* Replace ammeter (para 3-54).
	c. Generator regulator assembly defective.	*c.* Replace generator regulator assembly (para 3-104).
	d. Generator assembly defective.	*d.* Replace generator assembly (para 3-102).
	e. Loose or broken drive belts.	*e.* Tighten or replace drive belts (para 3-72).
28. Ammeter indicates excessive charge rate when batteries are fully charged.	*a.* Defective wiring in charging circuit.	*a.* Repair or replace as required.
	b. Ammeter defective.	*b.* Replace ammeter (para 3-54).
	c. Generator regulator assembly defective.	*c.* Replace generator regulator assembly (para 3-104).
29. Generator overheats.	*a.* Defective wiring.	*a.* Check and repair or replace.
	b. Generator regulator assembly defective.	*b.* Replace generator regulator assembly (para 3-104).
	c. Generator assembly defective.	*c.* Replace generator assembly (para 3-102).
30. Wheel wobbles.	*a.* Wheel bent.	*a.* Replace wheel (para 3-121).
	b. Wheel loose on hub.	*b.* Tighten nuts.
	c. Wheel bearing defective.	*c.* Replace wheel bearing (para 3-122).

Table 3-2. Troubleshooting — Continued.

Malfunction	Probable cause	Corrective action
31. Wheel bearing overheats.	*a.* Wheel bearing improperly installed.	*a.* Reinstall wheel bearing (para 3-122).
	b. Lack of lubrication.	*b.* Repack wheel bearing (para 3-122).
32. Tire wear abnormal.	*a.* Wheel loose on hub.	*a.* Tighten nuts.
	b. Improper tire inflation.	*b.* Inflate tire to proper pressure (fig. 3-13).
	c. Tie rod out of adjustment.	*c.* Adjust tie rod (fig. 3-123).
33. Brakes will not apply.	*a.* Broken or disconnected air line.	*a.* Connect or replace air line (para 3-128).
	b. Emergency relay valve defective.	*b.* Replace emergency relay valve (para 3-126).
	c. Punctured diaphragm in service chamber.	*c.* Replace service chamber on spring brake-service chamber (para 3-123 or 3-124).
	d. Other causes	*d.* Refer other causes to Direct Support, General Support, or Depot level maintenance personnel.
34. Brakes apply but braking is not adequate.	*a.* Brake linings and drums are wet.	*a.* Allow unit to sit until brakes dry out or apply brakes softly and tow unit until heat from brakes evaporates moisture. CAUTION **Do not tow vehicle for a long duration with brakes applied, excessive friction will cause glazing of brake shoes.**
	b. Low air pressure in brake system due to leak in air lines or fittings.	*b.* Repair or replace air lines of fittings (para 3-128).
	c. Service chamber leaking.	*c.* Replace service chamber or spring brake-service chamber (para 3-123 or 3-124).
	d. Brake drum broken or cracked.	*d.* Replace brake drum (para 3-122).
	e. Other causes	*e.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
35. Brakes apply too slowly.	*a.* Low air pressure in brake system.	*a.* Check towing vehicle. Check air compressor unit for leaks in air lines or service chambers.
	b. Restricted air line.	*b.* Replace air line (para 3-128).
	c. Emergency relay valve defective.	*c.* Replace emergency relay valve (para 3-126).
	d. Service chamber is leaking.	*d.* Replace service chamber or spring brake-service chamber (para 3-123 or 3-124).
	e. Other causes	*e.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
36. Brakes will not release.	*a.* Complete loss of air.	*a.* Inspect for broken or loose air lines, restrictions, or any other defect.
	b. Spring brake is defective.	*b.* Replace spring brake (para 3-123).
	c. Emergency relay valve defective.	*c.* Replace emergency relay valve (para 3-126).
	d. Brake shoes adjusted too close to brake drum.	*d.* Adjust brake shoes (para 3-129).
	e. Parking drum actuating mechanism defective.	*e.* Adjust or replace parking brake actuating mechanism (para 3-129).
	f. Other causes	*f.* Refer other causes to Direct Support, General Support and Depot level maintenance personnel.
37. Brakes release too slowly.	*a.* Restricted air line.	*a.* Remove restriction.
	b. Shoe movement binding on backing plate.	*b.* Lubricate shoe pivot points.
	c. Wedge actuating mechanism in service chamber is binding.	*c.* Replace service chamber or spring brake-service chamber (para 3-123 or 3-124).
	d. Other causes	*d.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
38. Brakes apply eneven or grab.	*a.* Emergency relay valve defective.	*a.* Replace emergency relay valve (para 3-126).
	b. Grease or moisture on brake linings.	*b.* Clean grease from linings and drums. If wet, allow unit to sit until brakes dry out or apply brakes softly and tow unit until heat from brakes evaporates moisture. CAUTION **Do not tow vehicle for a long duration with brakes applied, excessive friction will cause glazing of brake shoes.**

Table 3-2. Troubleshooting — Continued.

Malfunction	Probable cause	Corrective action
	c. Scored or cracked brake drum.	*c.* Turn drum on a lathe or replace drum (para 3-122).
	d. Loose wheel bearing.	*d.* Replace wheel bearing (para 3-122).
	e. Brake drum out-of-round.	*e.* Replace brake drum (para 3-122).
	f. Wedge actuating mechanism in service chamber is binding.	*f.* Replace service chamber or spring brake-service chamber (para 3-123 or 3-124).
	g. Other causes	*g.* Refer other causes to Direct Support, General Support, and Depot level maintenance personnel.
39. Parking brake does not hold.	*a.* Parking brake actuating mechanism not adjusted properly.	*a.* Adjust parking brake actuating mechanism (fig. 3-119).
	b. Spring brake defective.	*b.* Replace spring brake (para 3-123).

Section VII. RADIO INTERFERENCE SUPPRESSION

3-28. General Methods Used to Attain Proper Suppression

Essentially, suppression is attained by providing a low resistance path to ground for stray currents. The methods used include shielding the generator and generator regulator cables, and grounding the unit components using a braided electrical lead and toothed lockwashers.

3-29. Interference Suppression Components

a. Primary Suppression Components. The primary suppression components are those whose primary function is to suppress radio interference. These components are the shielded cables on the generator and generator regulator, figure 3-20.

b. Secondary Suppression Components. These components have radio interference suppression functions which are incidental or secondary to their primary functions. These are the toothed lockwashers and a braided electrical lead.

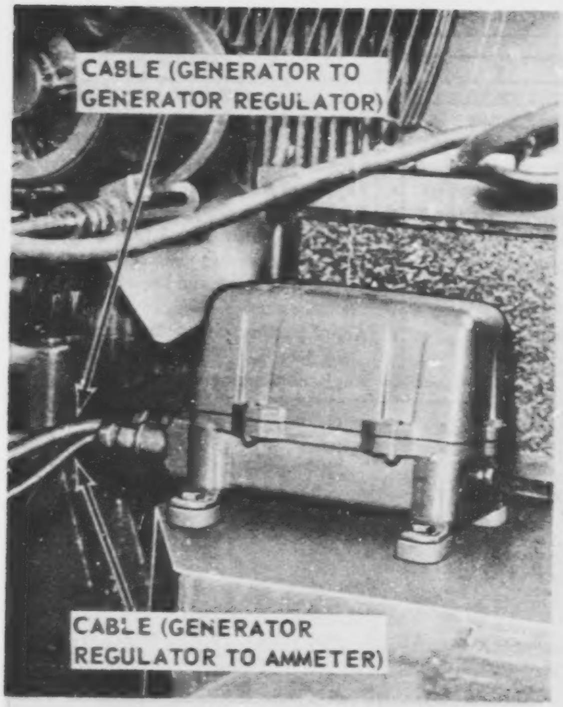
3-30. Replacement of Suppression Components

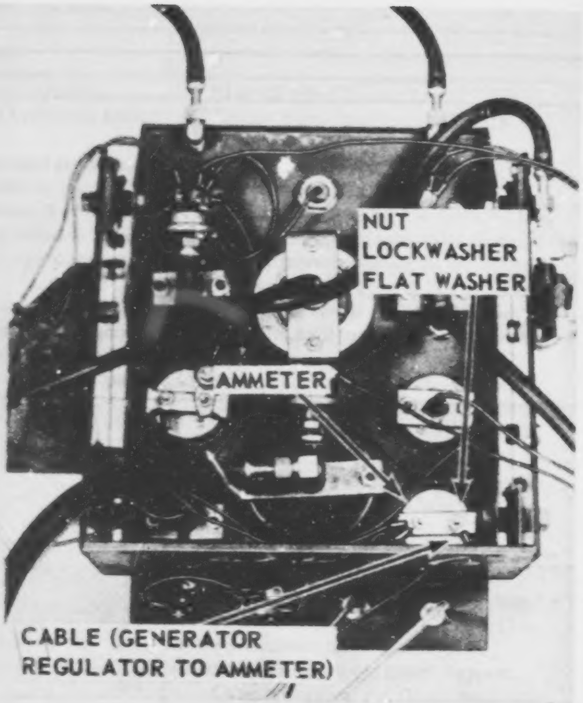
a. Refer to figure 3-20 for instructions on removing shielded cables from generator and generator regulator.

b. Removal instructions for secondary radio interference suppression components are included in the disassembly instructions for the individual assemblies on which they are used.

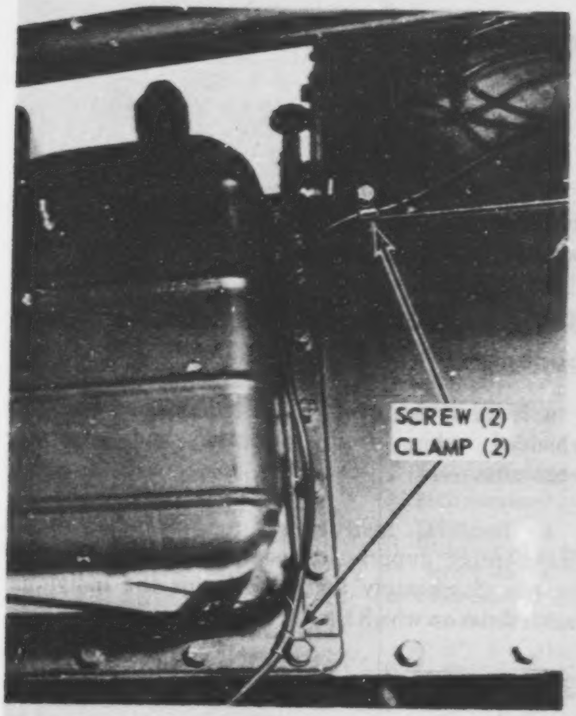
3-31. Testing of Radio Interference Suppression

Test the cables for proper grounding of the shielding. If test equipment is not available and interference is indicated, isolate the cause by replacing each cable, one at a time, until the interference stops.


CABLE (GENERATOR TO GENERATOR REGULATOR)
CABLE (GENERATOR REGULATOR TO AMMETER)


NUT
LOCKWASHER
FLAT WASHER
AMMETER
CABLE (GENERATOR REGULATOR TO AMMETER)

ME 4310-338-15/3-20


SCREW (2)
CLAMP (2)

REMOVAL

STEP 1. UNSCREW AND REMOVE GENERATOR TO GENERATOR REGULATOR CABLE.

STEP 2. REMOVE SCREWS AND CLAMPS FROM GENERATOR REGULATOR TO AMMETER CABLE. REMOVE NUT, LOCKWASHER, AND FLAT WASHER FROM AMMETER.

STEP 3. UNSCREW CABLE FROM GENERATOR REGULATOR; REMOVE CABLE.

INSTALLATION

STEP 1. INSTALL AND TIGHTEN BOTH CABLES TO GENERATOR REGULATOR. INSTALL AND TIGHTEN CABLE TO GENERATOR.

STEP 2. INSTALL CABLE ON AMMETER AND SECURE WITH FLAT WASHER, LOCKWASHER, AND NUT.

STEP 3. ATTACH CLAMPS ON GENERATOR REGULATOR TO AMMETER AND SECURE WITH SCREWS.

Figure 3-20. Primary suppression components; removal and installation.

Section VIII. HOUSING GROUP

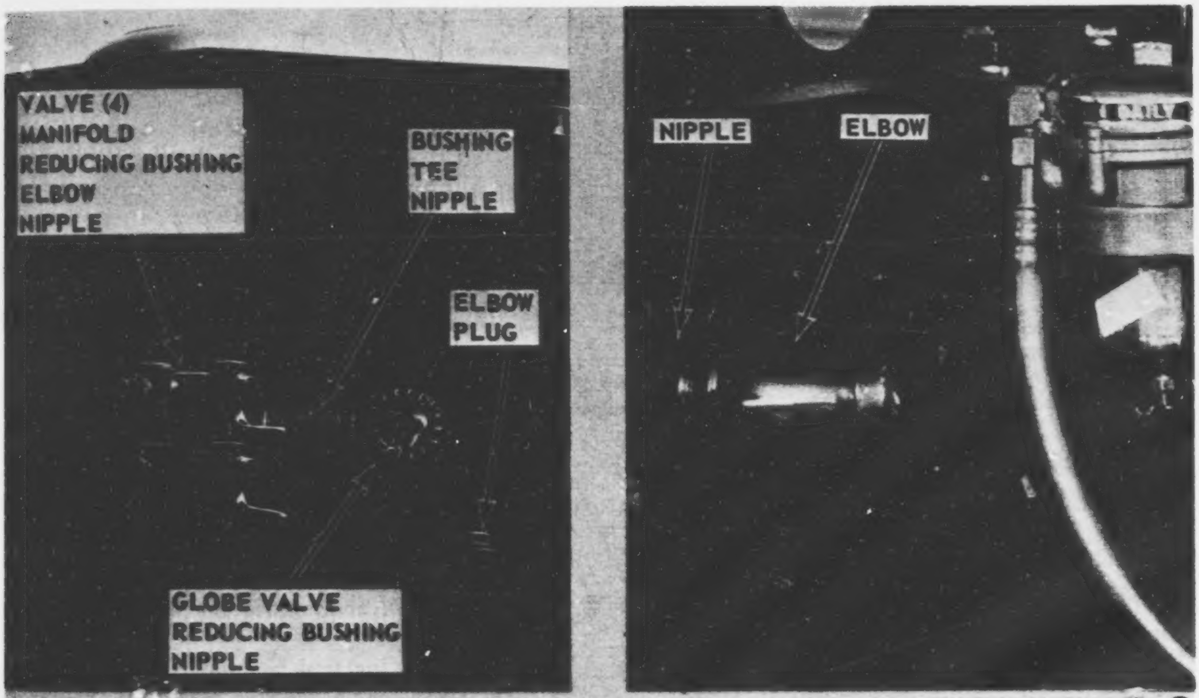
3-32. General

The engine and air compressor are enclosed in a sheet metal housing. Doors on both sides of the unit provide access to engine and compressor components. In addition to the doors, the housing group consists of side and end panels, door and roof supports, a grille, trays, rails, and a two-section roof. Clearance lights, reflectors, data and instruction plates a battery charging receptacle, air brake dummy connectors, and a cable hanger fasten to the outside of the housing.

3-33. Housing Group

a. Removal and Disassembly.

(1) Remove air cleaner caps, oil filler elbow, rain shield, and air discharge valves and piping as shown in figure 3-21.



ME 4310-338-15/3-21 ①

REMOVAL

STEP 1. REMOVE OIL FILLER PLUG, NIPPLE, AND ELBOWS FROM OIL SEPARATOR.

STEP 2. REMOVE ALL VALVES AND PIPING FROM AIR DISCHARGE CONNECTION.

STEP 3. LOOSEN BOLT AND NUT; REMOVE RAIN SHIELD.

STEP 4. LOOSEN BOLTS AND NUTS; REMOVE AIR CLEANER CAPS.

INSTALLATION

STEP 1. INSTALL AIR CLEANER CAPS AND SECURE WITH BOLTS AND NUTS.

STEP 2. INSTALL RAIN SHIELD AND SECURE WITH BOLT AND NUT.

STEP 3. INSTALL ALL VALVES AND PIPING TO AIR DISCHARGE CONNECTION.

STEP 4. INSTALL OIL FILLER ELBOWS, NIPPLE, AND PLUG TO OIL SEPARATOR.

Figure 3-21. Removal and installation of external components on housing group (sheet 1 of 2).

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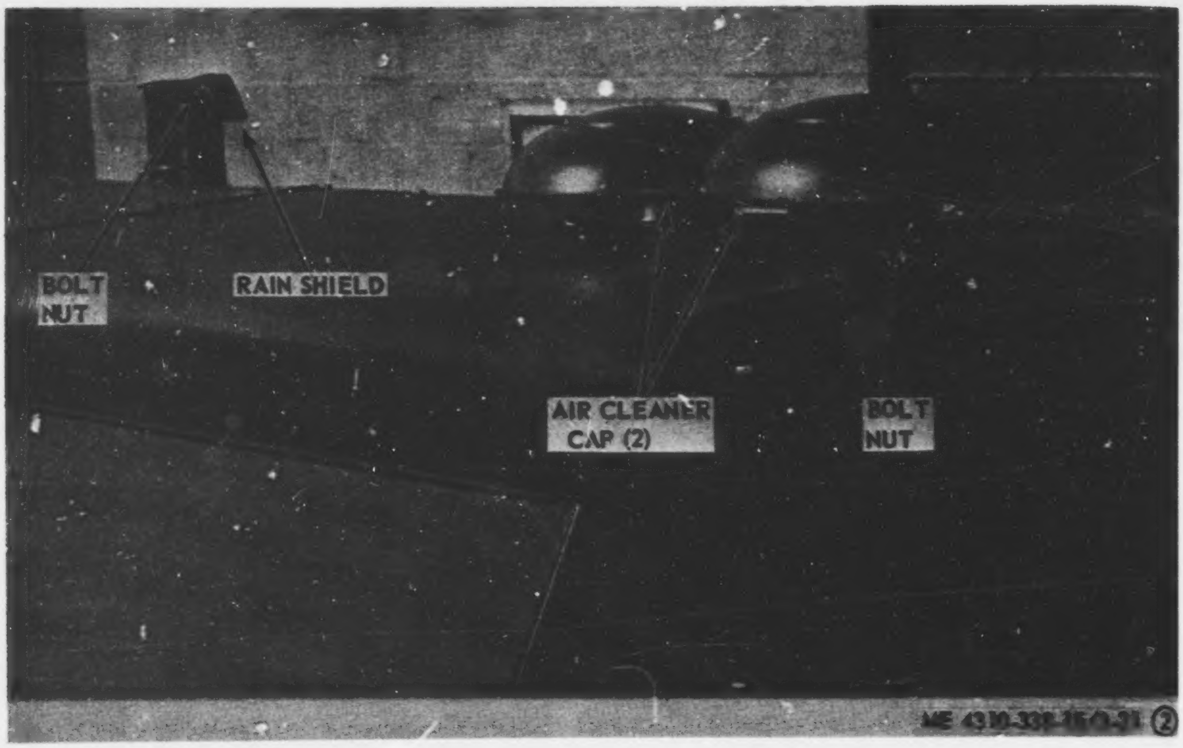

BOLT
NUT
RAIN SHIELD
AIR CLEANER
CAP (2)
BOLT
NUT
ME 4310-338-15/3-21 ②

Figure 3-21. Removal and installation of external components on housing group (sheet 2 of 2).

(2) Remove taillight and blackout taillight assemblies (para 3-35 and 3-36).

(3) Remove battery charging receptacle (para 3-38).

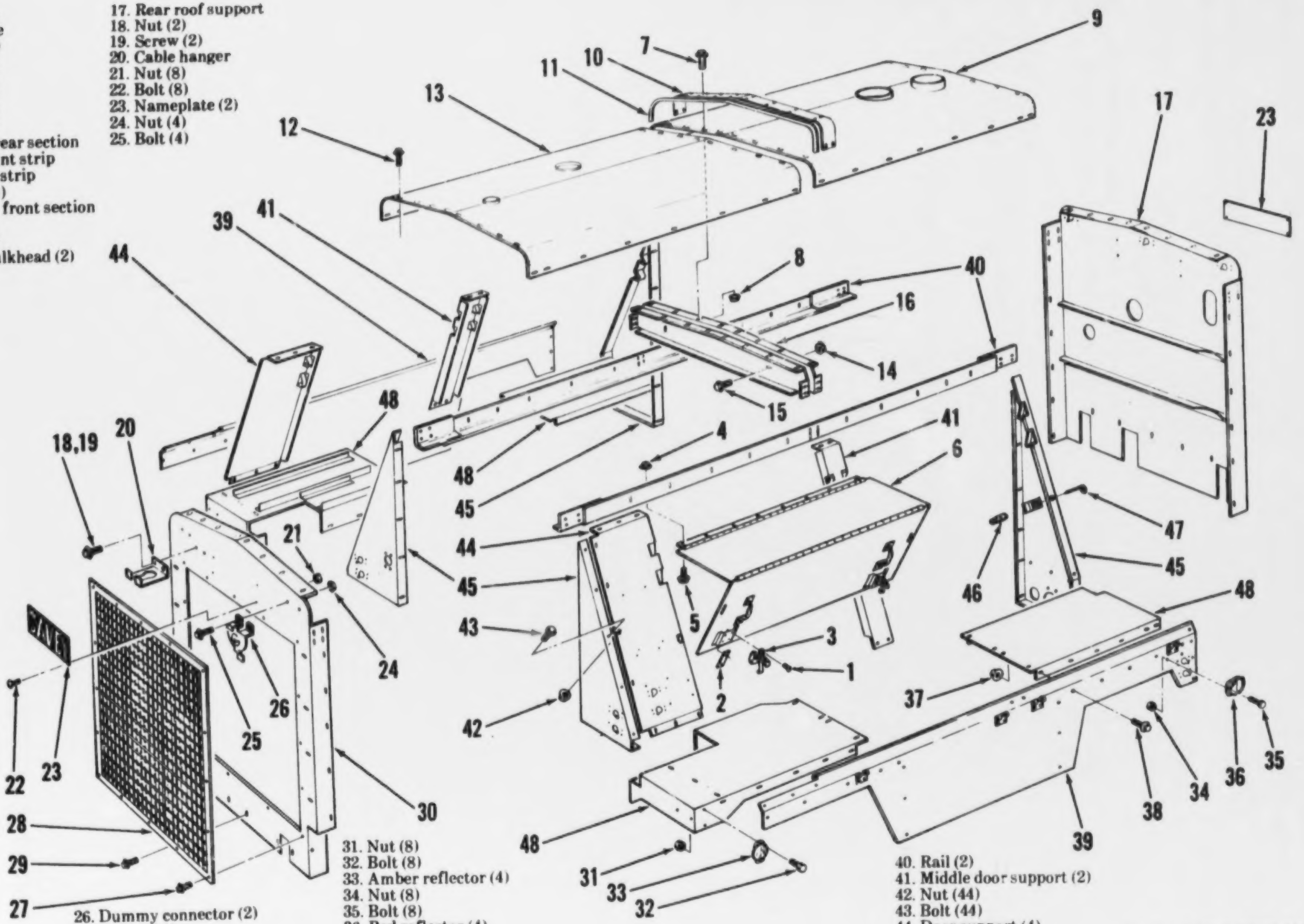
(4) Remove clearance light assemblies (para 3-37).

(5) Remove compressor air cleaner assembly (para 3-79).

(6) Remove fuel tank holddowns (para 3-92).

(7) Disassemble housing group in numerical sequence shown in figure 3-22.

1. Bolt (32)
2. Nut plate
3. Latch (8)
4. Nut (32)
5. Bolt (32)
6. Door (4)
7. Bolt (20)
8. Nut (20)
9. Roof — rear section
10. Roof joint strip
11. Sponge strip
12. Bolt (44)
13. Roof — front section
14. Nut (2)
15. Bolt (2)
16. Roof bulkhead (2)
17. Rear roof support
18. Nut (2)
19. Screw (2)
20. Cable hanger
21. Nut (8)
22. Bolt (8)
23. Nameplate (2)
24. Nut (4)
25. Bolt (4)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27
ME 4310-338-15/3-22

26. Dummy connector (2)
27. Screw (16)
28. Grille
29. Screw (7)
30. Front roof support

31. Nut (8)
32. Bolt (8)
33. Amber reflector (4)
34. Nut (8)
35. Bolt (8)
36. Red reflector (4)
37. Nut (76)
38. Bolt (76)
39. Side Panel (2)

40. Rail (2)
41. Middle door support (2)
42. Nut (44)
43. Bolt (44)
44. Door support (4)
45. End panel (4)
46. Spring (8)
47. Eye (8)
48. Tray

Figure 3-22. Housing group; diassembly and reassembly.

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect parts for cracks, distortion, breaks, or any other defect.

(3) Inspect all attaching hardware for damaged threads, distortion, cracks, or any other defect.

c. Reassembly and Installation.

(1) Reassemble housing group in reverse numerical sequence shown in figure 3-22. Install fuel tank holddowns (para 3-92).

(2) Install compressor air cleaner assembly (para 3-79).

(3) Install clearance light assemblies (para 3-37).

(4) Install battery charging receptacle (para 3-38).

(5) Install taillight and blackout taillight assemblies (para 3-35 and 3-36).

(6) Install air cleaner caps, oil filler elbow, rain shield, and air discharge valves and piping as shown in figure 3-21.

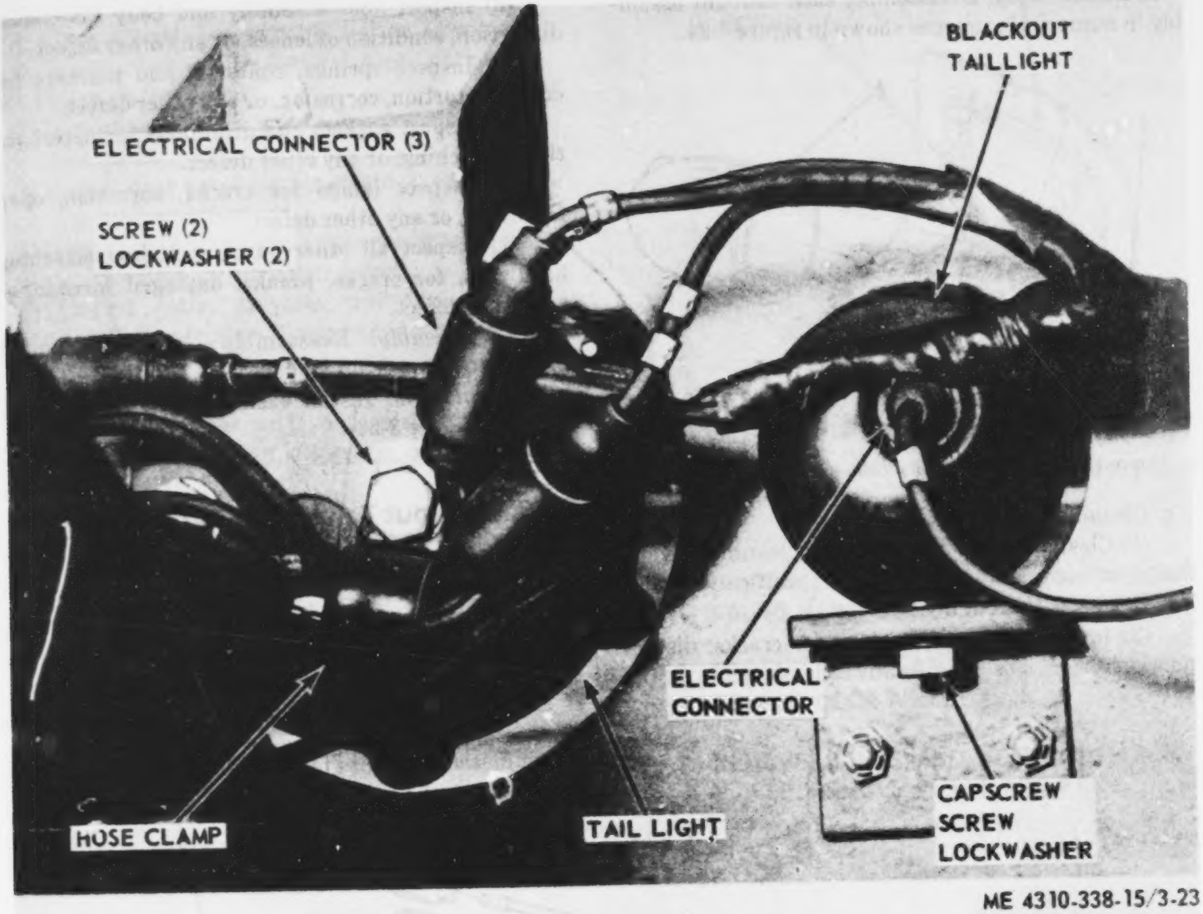
Section IX. AIR COMPRESSOR UNIT ELECTRICAL GROUP

3-34. General

The electrical group consists of the stoplights, taillights, marker lights, turn signals, blackout lights, clearance lights, battery charging receptacle, and the wiring harnesses. Each taillight assembly serves as a stoplight, taillight, turn signal, and blackout light. The marker light is used when towing the air compressor unit after dark so that a following vehicle can judge the distance to the unit. The clearance lights are either red, amber, or blackout and are mounted at various points on the housing. The battery charging receptacle, mounted on the front of the unit, provides a connection for charging the batteries from an external power source. All of the external lights are interconnected by a chassis wiring harness and receive power from the towing vehicle via the intervehicular electrical cable. The remaining electrical components are connected by individual wires or small wiring harnesses.

3-35. Taillight Assembly

a. Removal. Remove each taillight assembly as shown in figure 3-23.


ELECTRICAL CONNECTOR (3)
SCREW (2)
LOCKWASHER (2)
BLACKOUT TAILLIGHT
ELECTRICAL CONNECTOR
HOSE CLAMP
TAIL LIGHT
CAPSCREW
SCREW
LOCKWASHER

ME 4310-338-15/3-23

REMOVAL

STEP 1. DISCONNECT ELECTRICAL CONNECTORS.

STEP 2. REMOVE SCREWS, LOCKWASHERS, AND HOSE CLAMP. REMOVE TAILLIGHT ASSEMBLY.

INSTALLATION

STEP 1. POSITION TAILLIGHT ASSEMBLY AND SECURE WITH ONE SCREW AND LOCKWASHER.

STEP 2. CONNECT ELECTRICAL CONNECTORS.

STEP 3. PLACE WIRES IN HOSE CLAMP. INSTALL HOSE CLAMP, SCREW, AND LOCKWASHER.

A TAILLIGHT ASSY

REMOVAL

STEP 1. DISCONNECT ELECTRICAL CONNECTOR.

STEP 2. REMOVE SCREWS AND LOCKWASHER. REMOVE BLACKOUT STOPLIGHT.

INSTALLATION

STEP 1. POSITION BLACKOUT STOPLIGHT AND INSTALL SCREWS AND LOCKWASHER.

STEP 2. CONNECT ELECTRICAL CONNECTOR.

B BLACKOUT TAILLIGHT ASSY

Figure 3-23. Taillight assemblies; removal and installation.

b. Disassembly. Disassemble each taillight assembly in numerical sequence shown in figure 3-24.

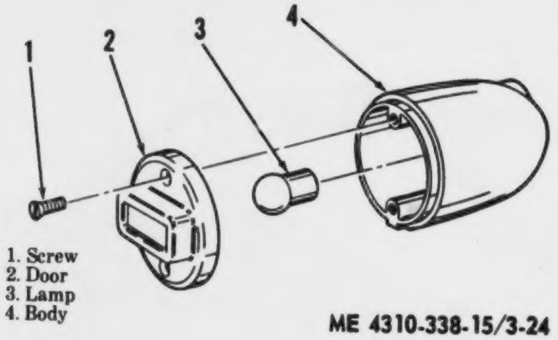


Figure 3-24. Taillight Assembly; Disassembly and Reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect plate and sockets for cracks, distortion, corrosion, looseness, or any other defect.

(3) Inspect door assembly and body for cracks, distortion, condition of lenses, or any other defect.

(4) Inspect springs, contacts, and markers for cracs, distortion, corrosion, or any other defect.

(5) Inspect gaskets and grommets for deterioration, stretching, or any other defect.

(6) Inspect lamps for cracks, corrosion, open filaments, or any other defect.

(7) Inspect all other parts, including attaching hardware, for cracks, breaks, damaged threads, or any other defect.

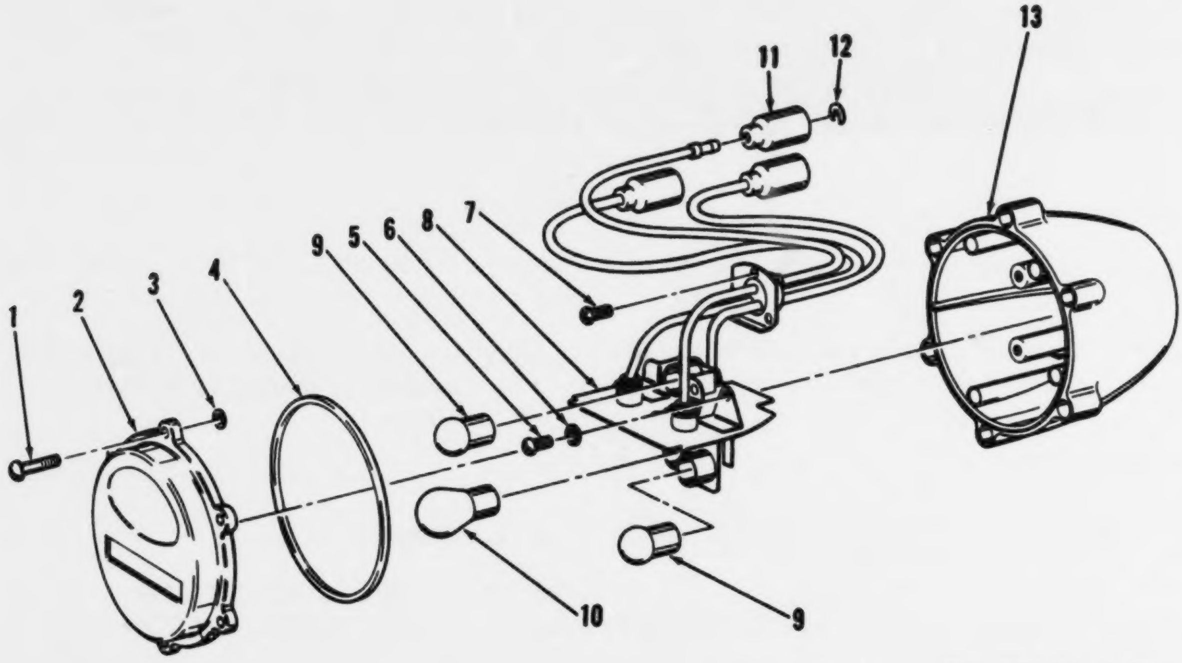
d. Reassembly. Reassemble taillight assembly in reverse numerical sequence shown in figure 3-24.

e. Installation. Install each taillight assembly as shown in figure 3-23.

3-36. Blackout Taillight Assembly

a. Removal. Remove blackout taillight assembly as shown in figure 3-23.

b. Disassembly. Disassemble blackout taillight assembly in numerical sequence shown in figure 3-25.



1. Screw (6)
2. Door
3. Retaining ring (6)
4. Gasket
5. Screw (2)
6. Washer (2)
7. Screw (3)
8. Socket-wire assembly
9. Lamp (2)
10. Lamp
11. Shell (3)
12. Washer (3)
13. Body

Figure 3-25. Blackout taillight assembly; disassembly and reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect sockets for cracks, breaks, corrosion, or any other defect.

(3) Inspect door and body for cracks, breaks, distortion, or any other defect.

(4) Inspect gasket and grommets for cracks, distortion, deterioration, or any other defect.

(5) Inspect plate, contacts, and springs for cracks, distortion, corrosion, or any other defect.

(6) Inspect lamp for cracks, corrosion, open filaments, or any other defect.

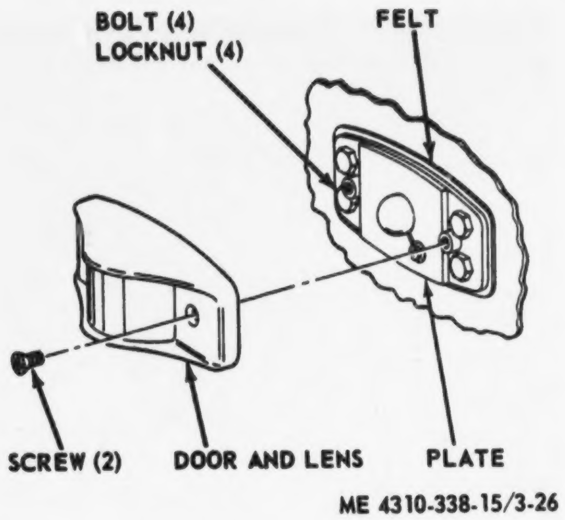
(7) Inspect all other parts, including attaching hardware, for cracks, breaks, distortion, or any other defect.

d. Reassembly. Reassemble blackout taillight assembly in reverse numerical sequence shown in figure 3-25.

e. Installation. Install blackout taillight assembly as shown in figure 3-23.

3-37. Clearance Light Assembly

a. Removal. Remove each clearance light assembly as shown in figure 3-26.



REMOVAL

STEP 1. DISCONNECT CLEARANCE LIGHT FROM WIRING HARNESS.

STEP 2. REMOVE SCREWS FROM DOOR AND LENS. REMOVE DOOR AND LENS.

STEP 3. REMOVE BOLTS AND LOCKNUTS FROM PLATE. REMOVE PLATE AND FELT.

INSTALLATION

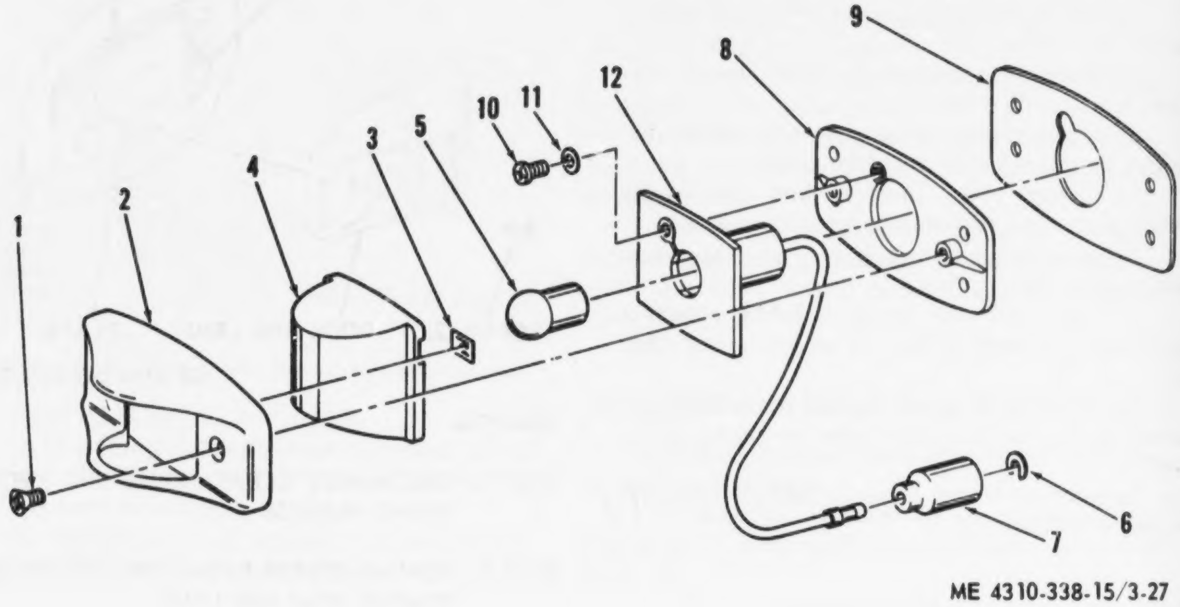
STEP 1. PLACE FELT AND PLATE IN MOUNTING POSITION AND SECURE WITH BOLTS AND LOCKNUTS.

STEP 2. INSTALL DOOR AND LENS AND SECURE WITH SCREWS.

STEP 3. CONNECT CLEARANCE LIGHT TO WIRING HARNESS.

Figure 3-26. Clearance light assemblies; removal and installation.

b. Disassembly. Disassemble clearance light assembly in numerical sequence shown in figure 3-27.



1. Screw
2. Door
3. Nut
4. Lens
5. Lamp
6. Washer
7. Shell
8. Plate
9. Gasket
10. Screw
11. Washer
12. Grommet-Wire

Figure 3-27. Clearance light assemblies; disassembly and reassembly.

c. Cleaning and Inspection.

(1) Wipe all parts clean with a dry, clean cloth. Nonelectrical metal parts can be cleaned using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect socket for cracks, breaks, corrosion, or any other defect.

(3) Inspect door and lens for cracks, breaks, distortion, or any other defect.

(4) Inspect wire and plug for cracks or any other defect.

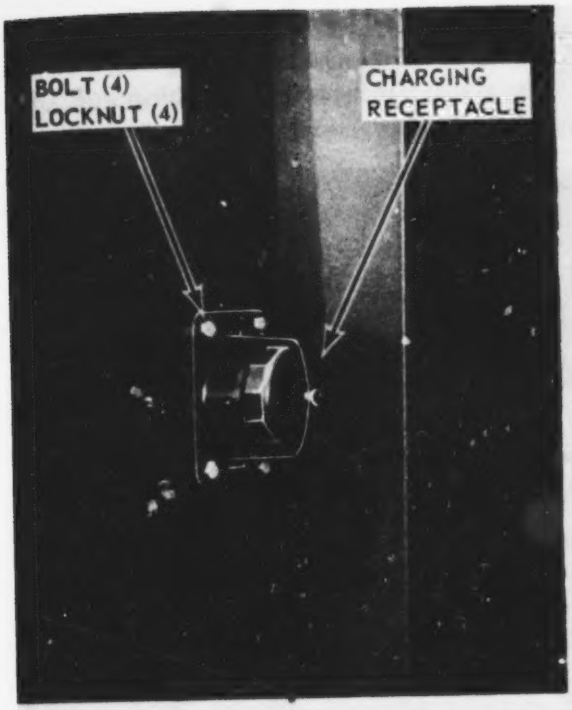
(5) Inspect all other parts for breaks, distortion, cracks, or any other defect.

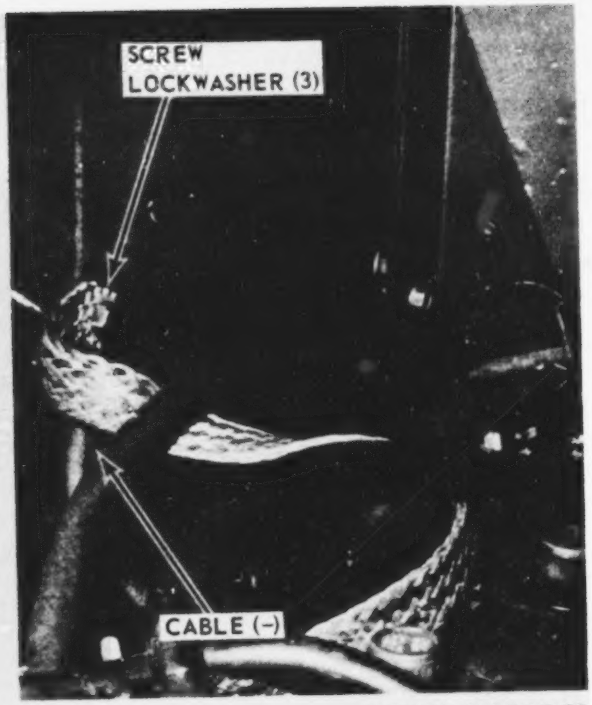
d. Reassembly. Reassemble clearance light assembly in reverse numerical sequence shown in figure 3-27.

e. Installation. Install each clearance light assembly as shown in figure 3-26.

3-38. Battery Charging Receptacle

a. Removal. Remove battery charging receptacle as shown in figure 3-28.


BOLT (4)
LOCKNUT (4)
CHARGING
RECEPTACLE


SCREW
LOCKWASHER (3)
CABLE (−)

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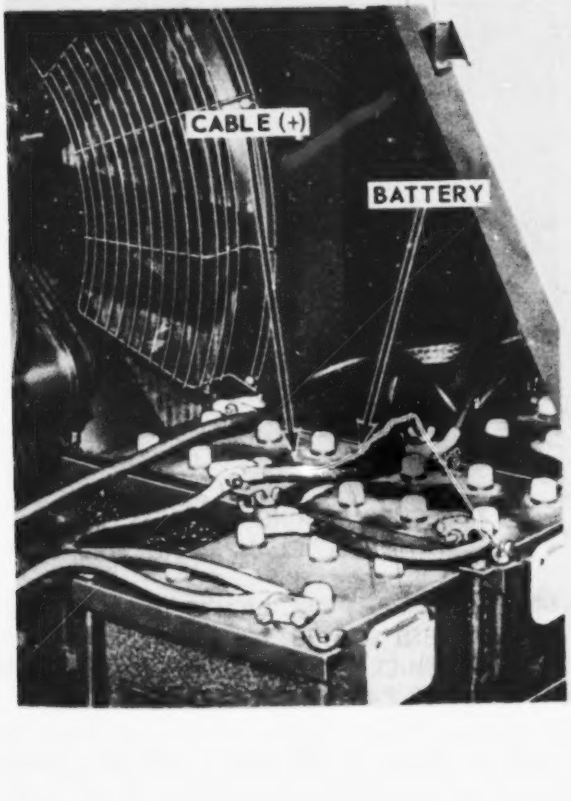

CABLE (+)
BATTERY

REMOVAL

STEP 1. REMOVE SCREW AND LOCKWASHERS. REMOVE GROUND CABLE.

STEP 2. DISCONNECT POSITIVE CABLE FROM BATTERY TERMINAL.

STEP 3. REMOVE BOLTS AND LOCKNUTS. REMOVE RECEPTACLE.

INSTALLATION

STEP 1. PLACE RECEPTACLE IN MOUNTING POSITION AND SECURE WITH BOLTS AND LOCKNUTS.

STEP 2. CONNECT POSITIVE CABLE TO BATTERY TERMINAL. SEE FIGURE 1-3 FOR WIRING DIAGRAM.

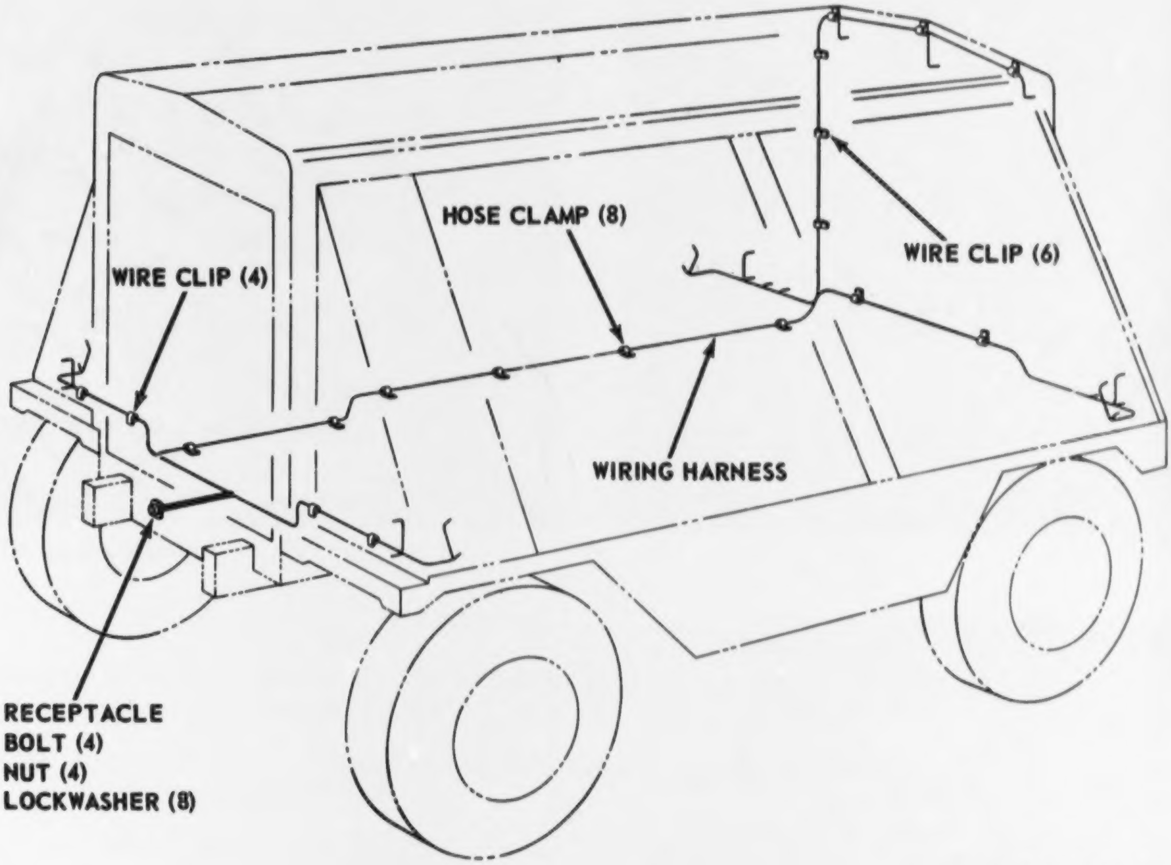
STEP 3. INSTALL GROUND CABLE AND BRAIDED ELECTRICAL LEAD. SECURE WITH SCREW AND LOCKWASHERS.

Figure 3-28. Battery charging receptacle; removal and Installation.

b. Installation. Install battery charging receptacle as shown in figure 3-28.

3-39. External Lighting Wiring Harness

a. Removal. Remove external lighting wiring harness as shown in figure 3-29.


HOSE CLAMP (8)
WIRE CLIP (4)
WIRE CLIP (6)
WIRING HARNESS
RECEPTACLE
BOLT (4)
NUT (4)
LOCKWASHER (8)
ME 4310-338-15/3-29

REMOVAL

STEP 1. DISCONNECT GROUND CABLE FROM BATTERY.

STEP 2. DISCONNECT ALL LIGHTS FROM WIRING HARNESS.

STEP 3. REMOVE ALL HOSE CLAMPS AND WIRE CLIPS.

STEP 4. REMOVE BOLTS, NUTS, AND LOCKWASHERS FROM RECEPTACLE. REMOVE WIRING HARNESS AND RECEPTACLE.

INSTALLATION

STEP 1. PLACE WIRING HARNESS AND RECEPTACLE ON UNIT. SECURE RECEPTACLE WITH BOLTS, NUTS, AND LOCKWASHERS.

STEP 2. SECURE WIRING HARNESS IN PLACE WITH HOSE CLAMPS AND WIRE CLIPS.

STEP 3. CONNECT ALL LIGHTS TO WIRING HARNESS (SEE FIG. 1-3). CONNECT A TOWING VEHICLE TO UNIT AND TEST LIGHTS FOR PROPER OPERATION.

STEP 4. CONNECT BATTERY GROUND CABLE.

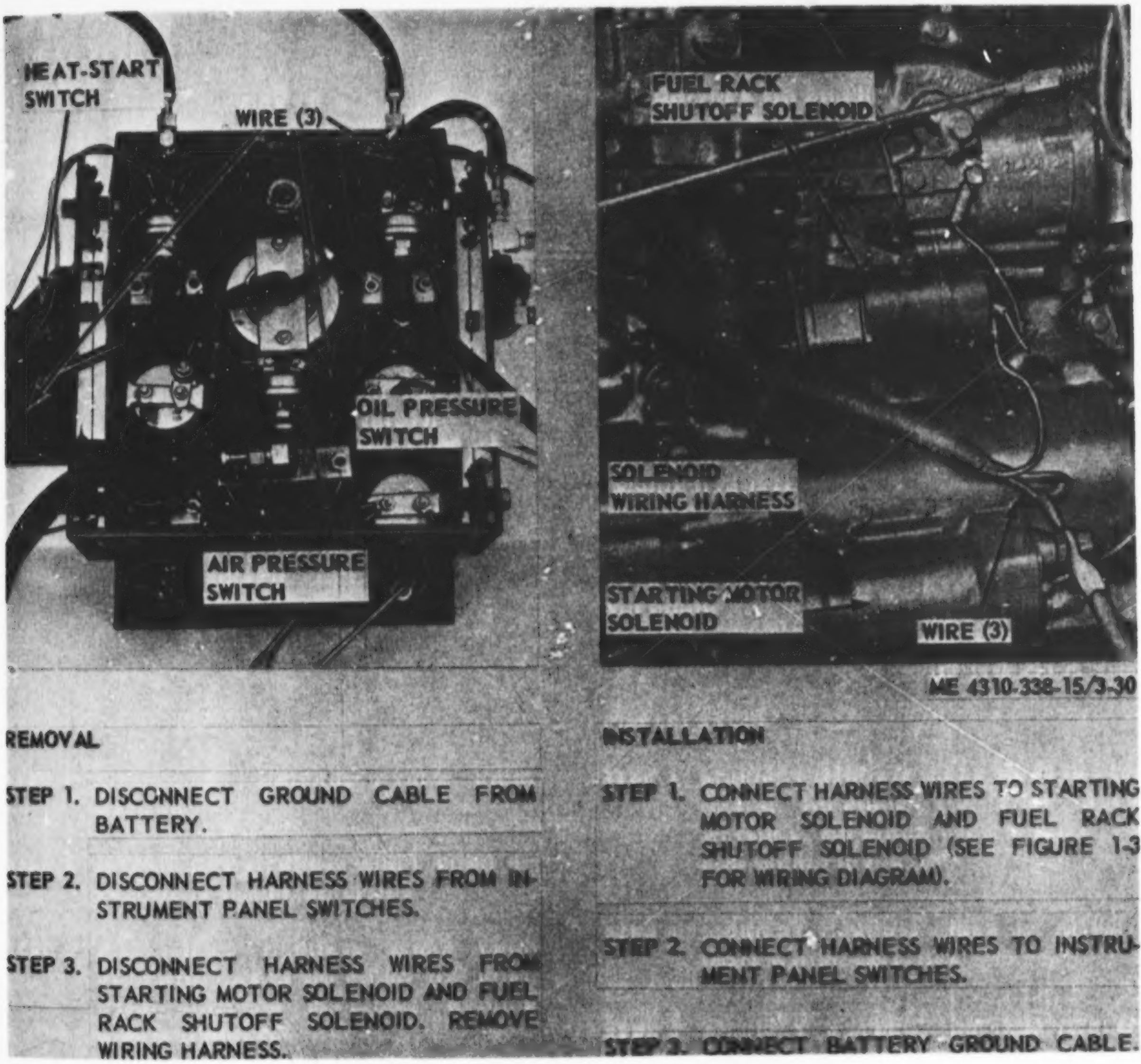
Figure 3-29. External lighting wiring harness; removal and installation.

b. Installation. Install external lighting wiring harness as shown in figure 3-29.

3-40. Solenoid Wiring Harness

a. Removal. Remove solenoid wiring harness as shown in figure 3-30.

b. Installation. Install solenoid wiring harness as shown in figure 3-30.



REMOVAL

STEP 1. DISCONNECT GROUND CABLE FROM BATTERY.

STEP 2. DISCONNECT HARNESS WIRES FROM INSTRUMENT PANEL SWITCHES.

STEP 3. DISCONNECT HARNESS WIRES FROM STARTING MOTOR SOLENOID AND FUEL RACK SHUTOFF SOLENOID. REMOVE WIRING HARNESS.

INSTALLATION

STEP 1. CONNECT HARNESS WIRES TO STARTING MOTOR SOLENOID AND FUEL RACK SHUTOFF SOLENOID (SEE FIGURE 1-3 FOR WIRING DIAGRAM).

STEP 2. CONNECT HARNESS WIRES TO INSTRUMENT PANEL SWITCHES.

STEP 3. CONNECT BATTERY GROUND CABLE.

Figure 3-30. Solenoid wiring harness; removal and installation.

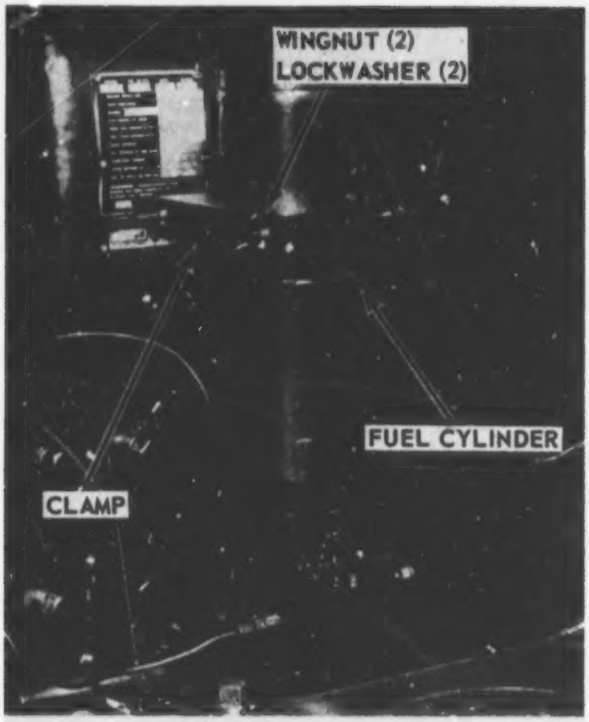
Section X. COLD WEATHER STARTING AID

3-41. General

The cold weather starting aid provides a means of injecting a highly combustible fuel mixture into the engine air intake to aid in starting the engine when ambient temperatures are below +32° F. The fuel, an ether base mixture, is stored in a metal cylinder that has a capacity of 790 cubic centimeters. The cylinder is approximately 95 percent expendable. The fuel cylinder mounts to a valve assembly which is actuated by the control cable mounted on the instrument panel. Each actuation of the valve lever injects a measured shot of 5 cubic centimeters of fuel into the engine intake air stream. The fuel mixture travels via copper tubing from the valve to an atomizer on the intake manifold.

3-42. Fuel Cylinder

a. Removal. Remove fuel cylinder as shown in figure 3-31.



ME 4310-338-15/3-31

REMOVAL

STEP 1. LOOSEN AND REMOVE WINGNUTS, LOCKWASHERS, AND CLAMP.

STEP 2. UNSCREW AND REMOVE FUEL CYLINDER FROM VALVE ASSEMBLY.

INSTALLATION

STEP 1. INSTALL A NEW FUEL CYLINDER IN VALVE ASSEMBLY AND TIGHTEN BY HAND.

NOTE

DO NOT OVERTIGHTEN FUEL CYLINDER.

STEP 2. INSTALL CLAMP AND SECURE WITH WINGNUTS AND LOCKWASHERS.

Figure 3-31. Fuel cylinder; removal and installation.

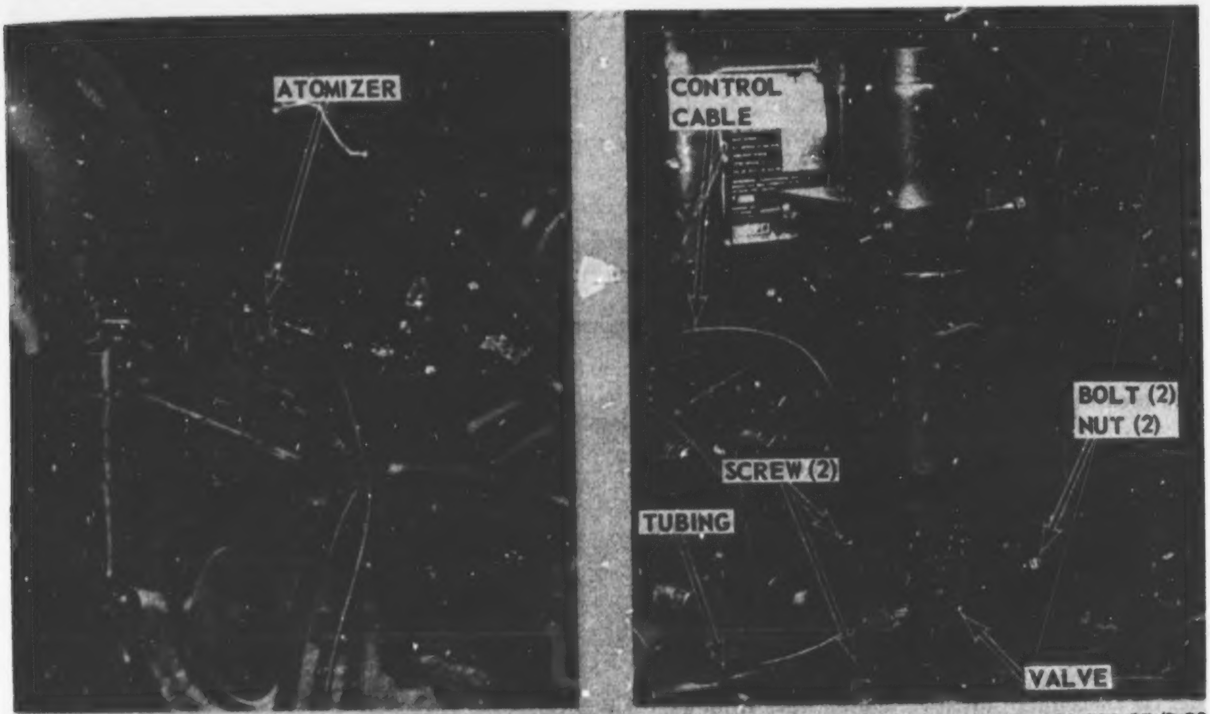
b. Installation. Install fuel cylinder as shown in figure 3-31.

3-43. Valve, Atomizer, and Tubing

a. Removal.

(1) Remove fuel cylinder (fig. 3-31).

(2) Remove valve, atomizer, and tubing as shown in figure 3-32.



REMOVAL

STEP 1. UNSCREW AND REMOVE TUBING AND ATOMIZER.

STEP 2. LOOSEN SCREWS AND DISCONNECT CONTROL CABLE FROM VALVE ASSEMBLY.

STEP 3. REMOVE BOLTS AND NUTS. REMOVE VALVE ASSEMBLY.

INSTALLATION

STEP 1. PLACE VALVE ASSEMBLY IN MOUNTING POSITION AND INSTALL BOLTS AND NUTS. TIGHTEN NUTS.

STEP 2. ATTACH CONTROL CABLE TO VALVE ASSEMBLY AND TIGHTEN SCREWS.

STEP 3. INSTALL AND TIGHTEN ATOMIZER AND TUBING.

Figure 3-32. Valve, atomizer, and tubing; removal and installation.

b. Cleaning and Inspection.

(1) Clean all metal parts and tubing using a cleaning solvent that is in accordance with Federal specification PD-680. Dry parts thoroughly.

(2) Inspect actuating valve for cracks, breaks, distortion, improper operation, or any other defect.

(3) Inspect tubing for cracks, breaks, kinks, or any other defect.

(4) Inspect atomizer for cracks, distortion, condition of threads and orifice hole, or any other defect.

(5) Inspect mounting hardware for cracks, breaks, distortion, damaged threads, or any other defect.

c. Installation.

(1) Install valve, atomizer, and tubing as shown in figure 3-32.

(2) Install fuel cylinder (fig. 3-31).

3-44. General

The controls and instruments are categorized into three basic groups; operation indicating group, control group, and safety group. The operation indicating group consists of gages that show engine oil pressure, compressor oil temperature, compressor oil level, air pressure, engine RPM and elapsed running time, engine water temperature, fuel level, fuel pressure, and battery-generator amperage. Also included are the air cleaner restriction indicators and a service meter. The control group consists of the fuel rack shutoff solenoid, engine stop control, safety push-button switch, throttle RUN-START lever, HEAT-START switch, cold weather starting aid control, fuel pressure switch, air pressure switch, and panel lamp switch. The safety group consists of components that monitor unit operation and shut down the engine if an abnormal condition develops. This group includes the water temperature safety switch, oil pressure safety switch, engine overspeed governor switch, and compressor thermostatic switch.

3-45. Instrument Panel Assembly

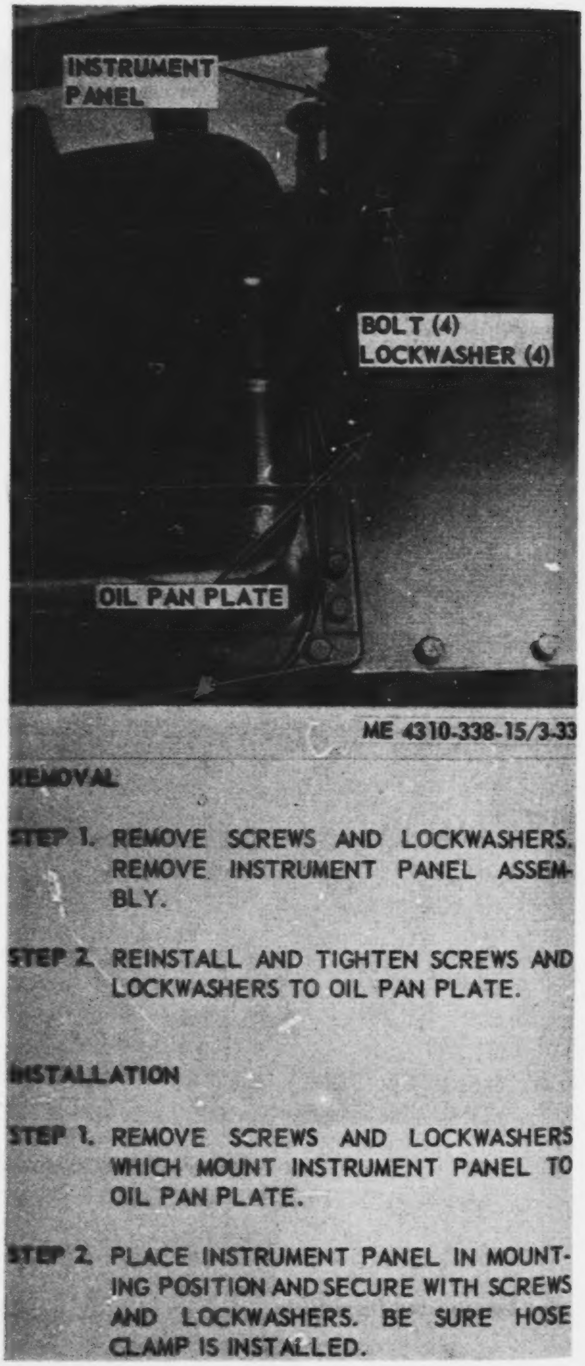
a. Removal.

(1) Disconnect air, fuel, and oil lines from gages as required for removal of instrument panel assembly.

(2) Disconnect wiring from switches and gages as required for removal of instrument panel assembly.

(3) Disconnect tachometer cable.

(4) Remove instrument panel assembly as shown in figure 3-33.



REMOVAL

STEP 1. REMOVE SCREWS AND LOCKWASHERS. REMOVE INSTRUMENT PANEL ASSEMBLY.

STEP 2. REINSTALL AND TIGHTEN SCREWS AND LOCKWASHERS TO OIL PAN PLATE.

INSTALLATION

STEP 1. REMOVE SCREWS AND LOCKWASHERS WHICH MOUNT INSTRUMENT PANEL TO OIL PAN PLATE.

STEP 2. PLACE INSTRUMENT PANEL IN MOUNTING POSITION AND SECURE WITH SCREWS AND LOCKWASHERS. BE SURE HOSE CLAMP IS INSTALLED.

Figure 3-33. Instrument panel assembly; removal and installation.

b. Cleaning and Inspection.

(1) Wipe instrument panel assembly clean using a clean cloth soaked in a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Inspect all instruments for damage or loose mounting.

(3) Inspect hoses and cables for kinks, cracks, or any other defect.

(4) Inspect all other parts for cracks, breaks, distortion, or any other defect.

c. Installation.

(1) Install instrument panel assembly as shown in figure 3-33.

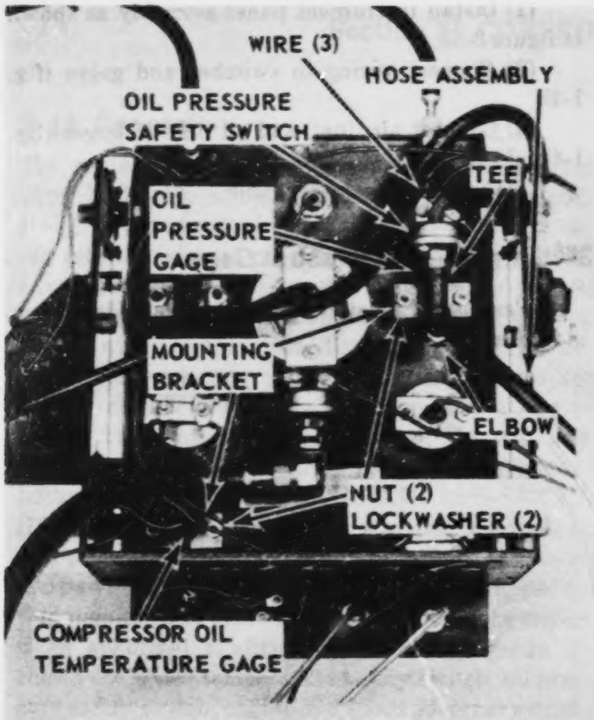
(2) Connect wiring to switches and gages (fig. 1-3).

(3) Connect air, fuel, and oil lines to gages (fig. 1-4 and 1-5).

(4) Connect tachometer cable.

3-46. Engine Oil Pressure Gage

a. Removal. Remove oil pressure gage as shown in figure 3-34.


WIRE (3)
HOSE ASSEMBLY
OIL PRESSURE SAFETY SWITCH
TEE
OIL PRESSURE GAGE
MOUNTING BRACKET
ELBOW
NUT (2)
LOCKWASHER (2)
COMPRESSOR OIL TEMPERATURE GAGE

REMOVAL

STEP 1. DISCONNECT HOSE ASSEMBLY AND WIRES.

STEP 2. REMOVE SWITCH, ELBOW, AND TEE.

STEP 3. REMOVE NUTS, LOCKWASHERS, AND MOUNTING BRACKET. REMOVE OIL PRESSURE GAGE.

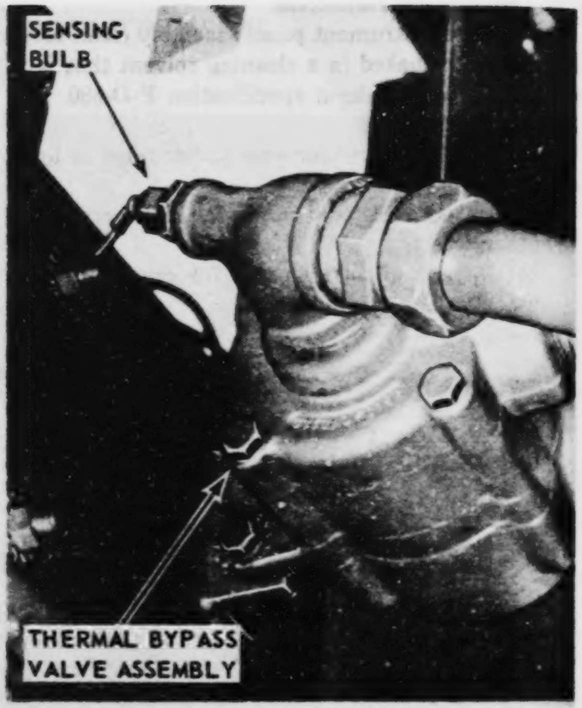
INSTALLATION

STEP 1. PLACE OIL PRESSURE GAGE ON INSTRUMENT PANEL AND INSTALL MOUNTING BRACKET. SECURE WITH NUTS AND LOCKWASHERS.

STEP 2. INSTALL TEE, ELBOW, AND SWITCH.

STEP 3. CONNECT HOSE ASSEMBLY AND WIRES (SEE FIGURE 1-3 FOR WIRING DIAGRAM).

A **ENGINE OIL PRESSURE GAGE; REMOVAL AND INSTALLATION.**


SENSING BULB
THERMAL BYPASS VALVE ASSEMBLY

ME 4310-338-15/3-34 ①

REMOVAL

STEP 1. UNSCREW AND REMOVE OIL TEMPERATURE SENSING BULB FROM THERMAL BYPASS VALVE ASSEMBLY.

STEP 2. REMOVE SCREWS, LOCKWASHERS, AND MOUNTING BRACKET. REMOVE COMPRESSOR OIL TEMPERATURE GAGE.

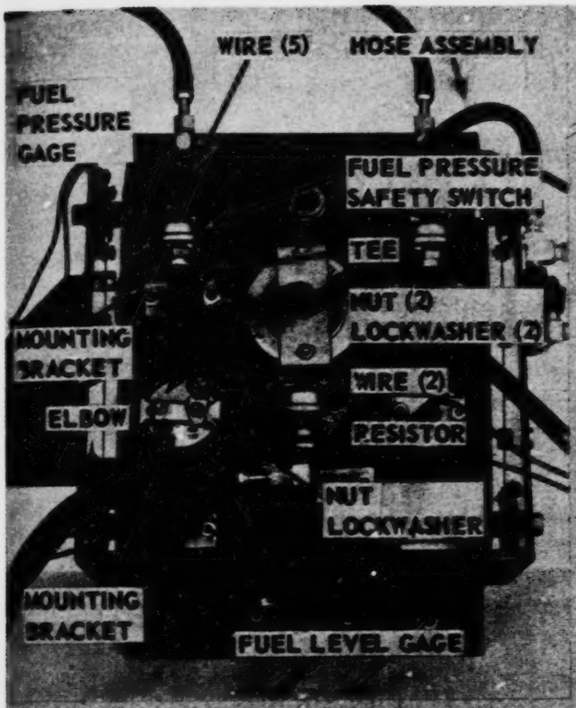
INSTALLATION

STEP 1. PLACE OIL TEMPERATURE GAGE ON INSTRUMENT PANEL AND INSTALL MOUNTING BRACKET. SECURE WITH NUTS AND LOCKWASHERS.

STEP 2. INSTALL AND TIGHTEN OIL TEMPERATURE SENSING BULB ON THERMAL BYPASS VALVE ASSEMBLY.

B **COMPRESSOR OIL TEMPERATURE GAGE; REMOVAL AND INSTALLATION.**

Figure 3-34. Instrument Panel Controls and Instruments, Removal and Installation (sheet 1 of 8).


WIRE (5)
HOSE ASSEMBLY
FUEL PRESSURE GAGE
FUEL PRESSURE SAFETY SWITCH
TEE
NUT (2)
LOCKWASHER (2)
MOUNTING BRACKET
WIRE (2)
ELBOW
RESISTOR
NUT
LOCKWASHER
MOUNTING BRACKET
FUEL LEVEL GAGE

REMOVAL

STEP 1. DISCONNECT HOSE ASSEMBLY AND WIRES.

STEP 2. REMOVE SWITCH, ELBOW, AND TEE.

STEP 3. REMOVE NUTS, LOCKWASHERS, AND MOUNTING BRACKET. REMOVE FUEL PRESSURE GAGE.

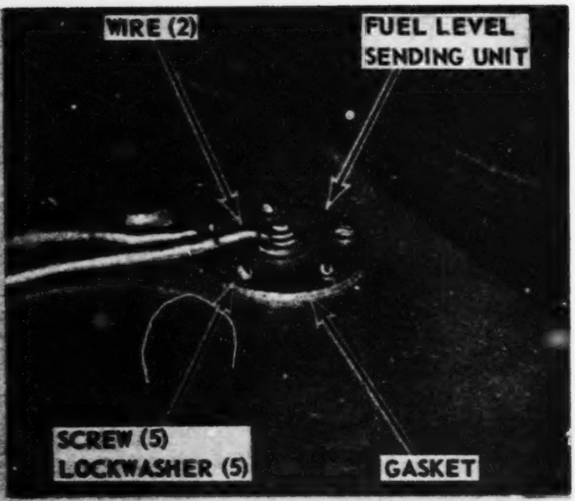
INSTALLATION

STEP 1. PLACE FUEL PRESSURE GAGE ON INSTRUMENT PANEL AND INSTALL MOUNTING BRACKET. SECURE WITH NUTS AND LOCKWASHERS.

STEP 2. INSTALL TEE, ELBOW, AND SWITCH.

STEP 3. CONNECT HOSE ASSEMBLY AND WIRES (SEE FIGURE 1-3 FOR WIRING DIAGRAM).

C FUEL PRESSURE GAGE; REMOVAL AND INSTALLATION.


WIRE (2)
FUEL LEVEL SENDING UNIT
SCREW (5)
LOCKWASHER (5)
GASKET

ME 4310-338-15/3-34 ②

REMOVAL

STEP 1. DISCONNECT WIRES FROM GAGE AND SENDING UNIT.

STEP 2. REMOVE NUT, LOCKWASHER, AND RESISTOR FROM GAGE.

STEP 3. REMOVE NUTS, LOCKWASHERS, AND MOUNTING BRACKET. REMOVE FUEL LEVEL GAGE.

STEP 4. REMOVE SCREWS AND LOCKWASHERS. REMOVE SENDING UNIT AND GASKET.

INSTALLATION

STEP 1. INSTALL SENDING UNIT AND GASKET. SECURE WITH SCREWS AND LOCKWASHERS. CONNECT WIRES (SEE FIGURE 1-3 FOR WIRING DIAGRAM.

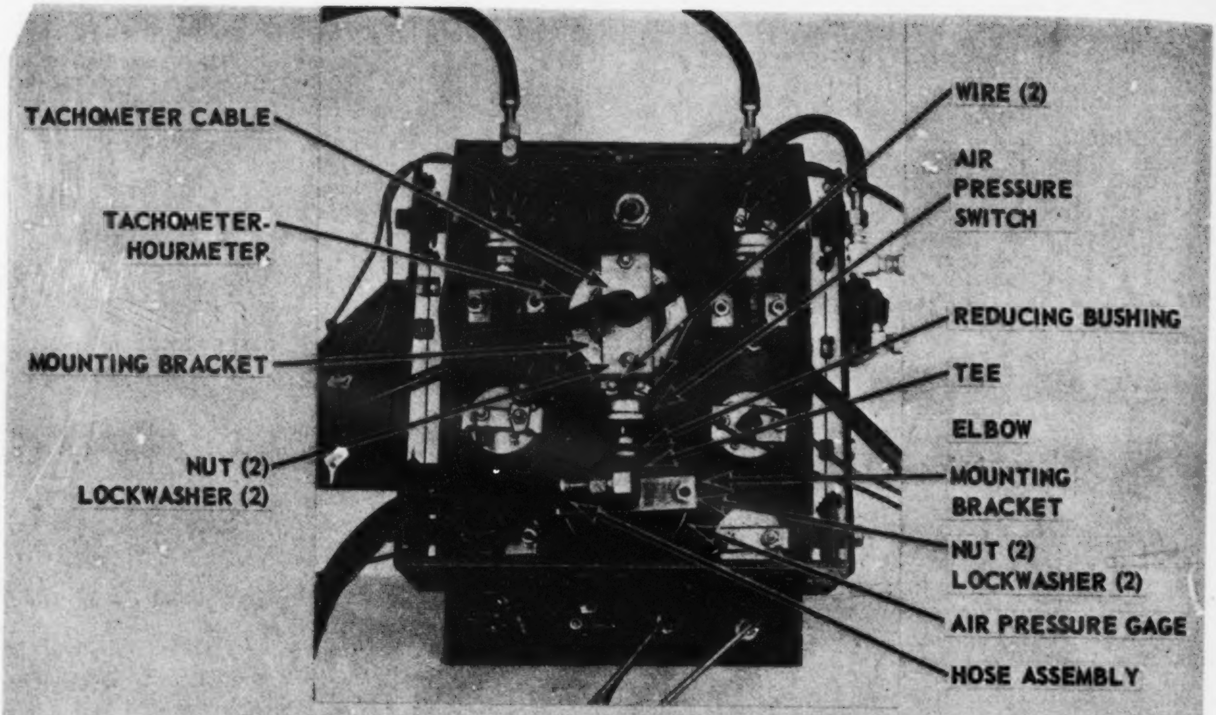
STEP 2. PLACE FUEL LEVEL GAGE ON INSTRUMENT PANEL AND INSTALL MOUNTING BRACKET. SECURE WITH NUTS AND LOCKWASHERS.

STEP 3. INSTALL RESISTOR ON REAR OF GAGE AND SECURE WITH NUT AND LOCKWASHER.

STEP 4. CONNECT WIRES TO GAGE (SEE FIGURE 1-3).

D FUEL LEVEL GAGE; REMOVAL AND INSTALLATION.

Figure 3-34. Instrument Panel Controls and Instruments, Removal and Installation (sheet 2 of 8).


TACHOMETER CABLE
TACHOMETER-HOURMETER
MOUNTING BRACKET
NUT (2)
LOCKWASHER (2)
WIRE (2)
AIR PRESSURE SWITCH
REDUCING BUSHING
TEE
ELBOW
MOUNTING BRACKET
NUT (2)
LOCKWASHER (2)
AIR PRESSURE GAGE
HOSE ASSEMBLY

ME 4310-338-15/3-34 ③

REMOVAL

STEP 1. DISCONNECT TACHOMETER CABLE.

STEP 2. REMOVE NUTS, LOCKWASHERS, AND MOUNTING BRACKET. REMOVE TACHOMETER-HOURMETER.

INSTALLATION

STEP 1. PLACE TACHOMETER-HOURMETER ON INSTRUMENT PANEL AND INSTALL MOUNTING BRACKET. SECURE WITH NUTS AND LOCKWASHERS.

STEP 2. CONNECT TACHOMETER CABLE.

E AIR PRESSURE GAGE; REMOVAL AND INSTALLATION.

REMOVAL

STEP 1. DISCONNECT HOSE ASSEMBLY AND WIRES.

STEP 2. REMOVE SWITCH, REDUCING BUSHING, ELBOW, AND TEE.

STEP 3. REMOVE NUTS, LOCKWASHERS, AND MOUNTING BRACKET. REMOVE AIR PRESSURE GAGE.

INSTALLATION

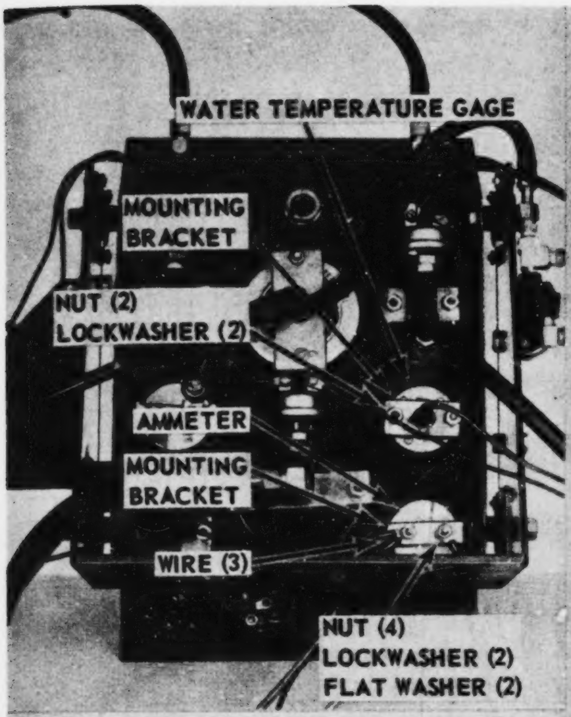
STEP 1. PLACE AIR PRESSURE GAGE ON INSTRUMENT PANEL AND INSTALL MOUNTING BRACKET. SECURE WITH NUTS AND LOCKWASHERS.

STEP 2. INSTALL TEE, ELBOW, REDUCING BUSHING, AND SWITCH.

STEP 3. CONNECT WIRES AND HOSE ASSEMBLY.

F TACHOMETER-HOURMETER; REMOVAL AND INSTALLATION.

Figure 3-34. Instrument Panel Controls and Instruments, Removal and Installation (sheet 3 of 8).


WATER TEMPERATURE GAGE
MOUNTING BRACKET
NUT (2)
LOCKWASHER (2)
AMMETER
MOUNTING BRACKET
WIRE (3)
NUT (4)
LOCKWASHER (2)
FLAT WASHER (2)

REMOVAL

STEP 1. DISCONNECT WIRES.

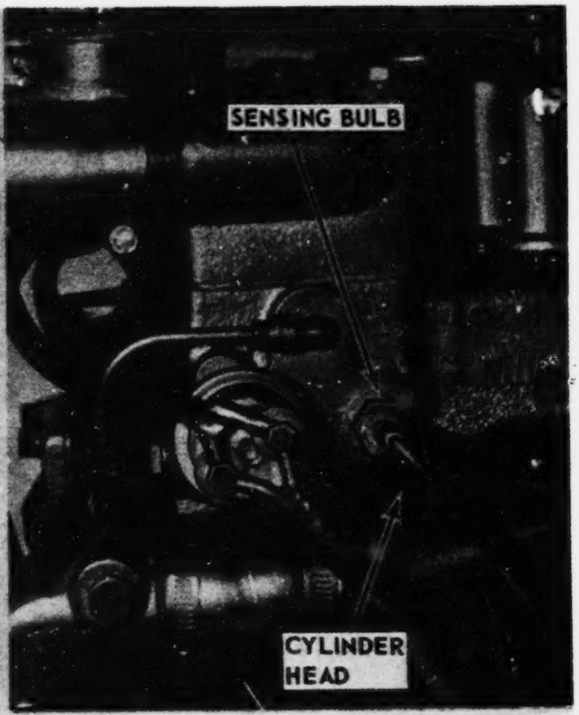
STEP 2. REMOVE NUTS, LOCKWASHERS, AND MOUNTING BRACKET. REMOVE AMMETER.

INSTALLATION

STEP 1. PLACE AMMETER ON INSTRUMENT PANEL AND INSTALL MOUNTING BRACKET. SECURE WITH NUTS AND LOCKWASHERS.

STEP 2. CONNECT WIRES (SEE FIGURE 1-3 FOR WIRING DIAGRAM).

G AMMETER;
REMOVAL AND INSTALLATION.


SENSING BULB
CYLINDER HEAD

ME 4310-338-15/3-34 ④

REMOVAL

STEP 1. UNSCREW AND REMOVE WATER TEMPERATURE SENSING BULB FROM CYLINDER HEAD.

STEP 2. REMOVE SCREWS, LOCKWASHERS, AND MOUNTING BRACKET. REMOVE WATER TEMPERATURE GAGE.

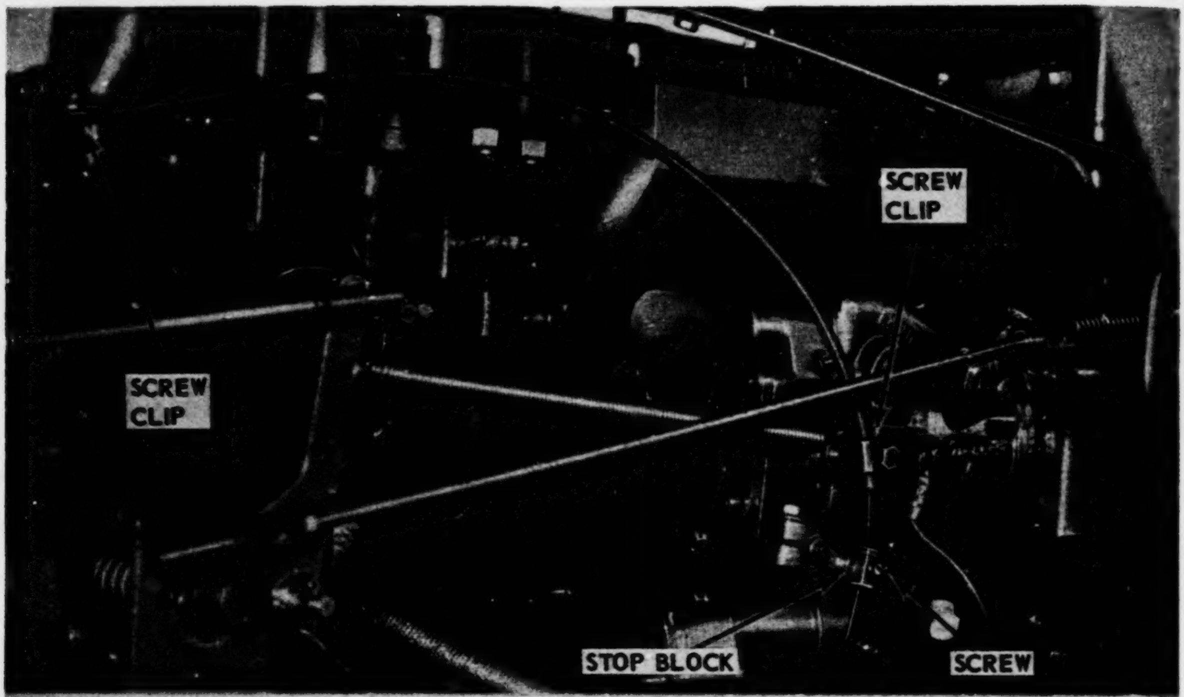
INSTALLATION

STEP 1. PLACE WATER TEMPERATURE GAGE ON INSTRUMENT PANEL AND INSTALL MOUNTING BRACKET. SECURE WITH NUTS AND LOCKWASHERS.

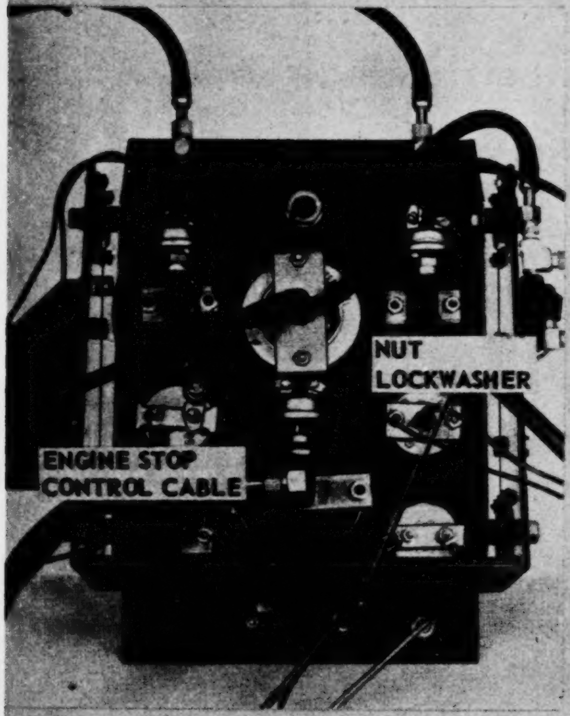
STEP 2. INSTALL AND TIGHTEN WATER TEMPERATURE SENSING BULB ON CYLINDER HEAD.

H WATER TEMPERATURE GAGE;
REMOVAL AND INSTALLATION.

Figure 3-34. Instrument Panel Controls and Instruments, Removal and Installation (sheet 4 of 8).


SCREW
CLIP
SCREW
CLIP
STOP BLOCK
SCREW

ME 4310-338-15/3-34 ⑤


NUT
LOCKWASHER
ENGINE STOP
CONTROL CABLE

REMOVAL

STEP 1. LOOSEN SCREW ON STOP BLOCK AND REMOVE CONTROL CABLE WIRE.

STEP 2. LOOSEN SCREWS ON CABLE CLIPS. SLIDE CONTROL CABLE OUT OF CLIPS.

STEP 3. REMOVE NUT AND LOCKWASHER. REMOVE CONTROL CABLE.

INSTALLATION

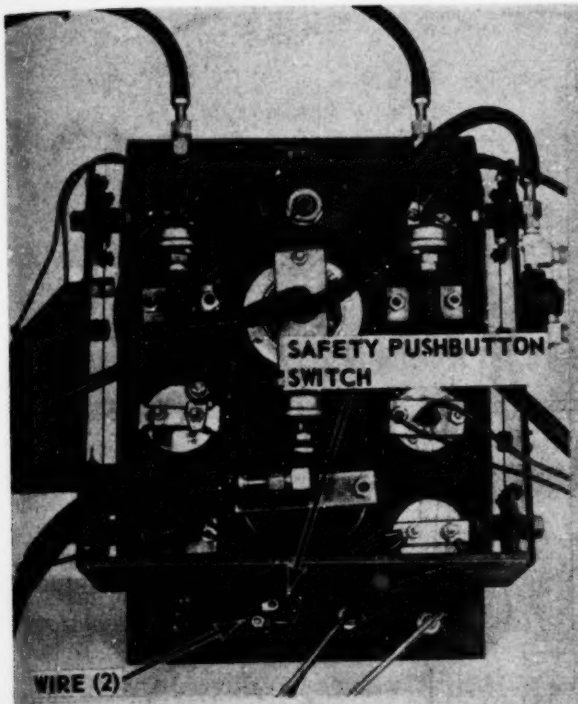
STEP 1. PLACE CONTROL CABLE IN MOUNTING POSITION AND SECURE WITH NUT AND LOCKWASHER.

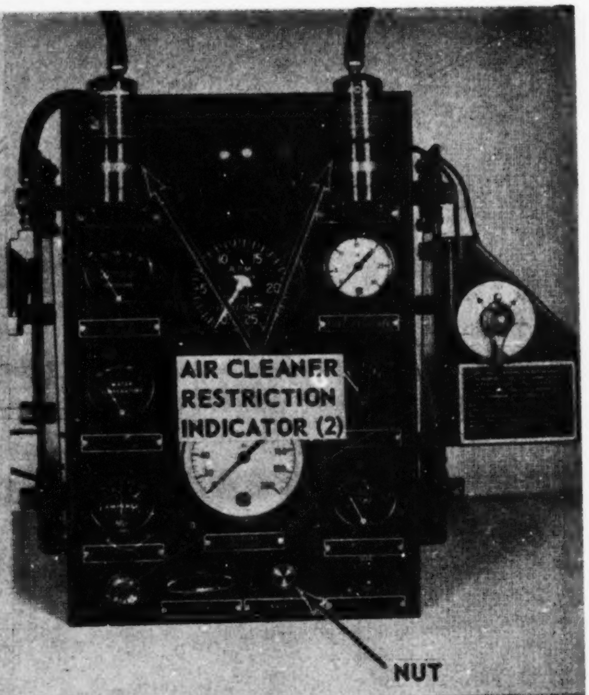
STEP 2. LOOSEN SCREWS ON CABLE CLIPS. SLIDE CONTROL CABLE INTO CLIPS AND TIGHTEN SCREWS.

STEP 3. INSTALL CONTROL CABLE WIRE IN STOP BLOCK AND SECURE WITH SCREW.

ENGINE STOP CONTROL CABLE; REMOVAL AND INSTALLATION.

Figure 3-34. Instrument Panel Controls and Instruments, Removal and Installation (sheet 5 of 8).


SAFETY PUSHBUTTON SWITCH
WIRE (2)


AIR CLEANER RESTRICTION INDICATOR (2)
NUT

ME 4310-338-15/3-34 ⑥

REMOVAL

STEP 1. DISCONNECT WIRES.

STEP 2. REMOVE NUT AND SWITCH.

INSTALLATION

STEP 1. PLACE SWITCH IN MOUNTING POSITION AND SECURE WITH NUT.

STEP 2. CONNECT WIRES.

J SAFETY PUSHBUTTON SWITCH; REMOVAL AND INSTALLATION.

REMOVAL

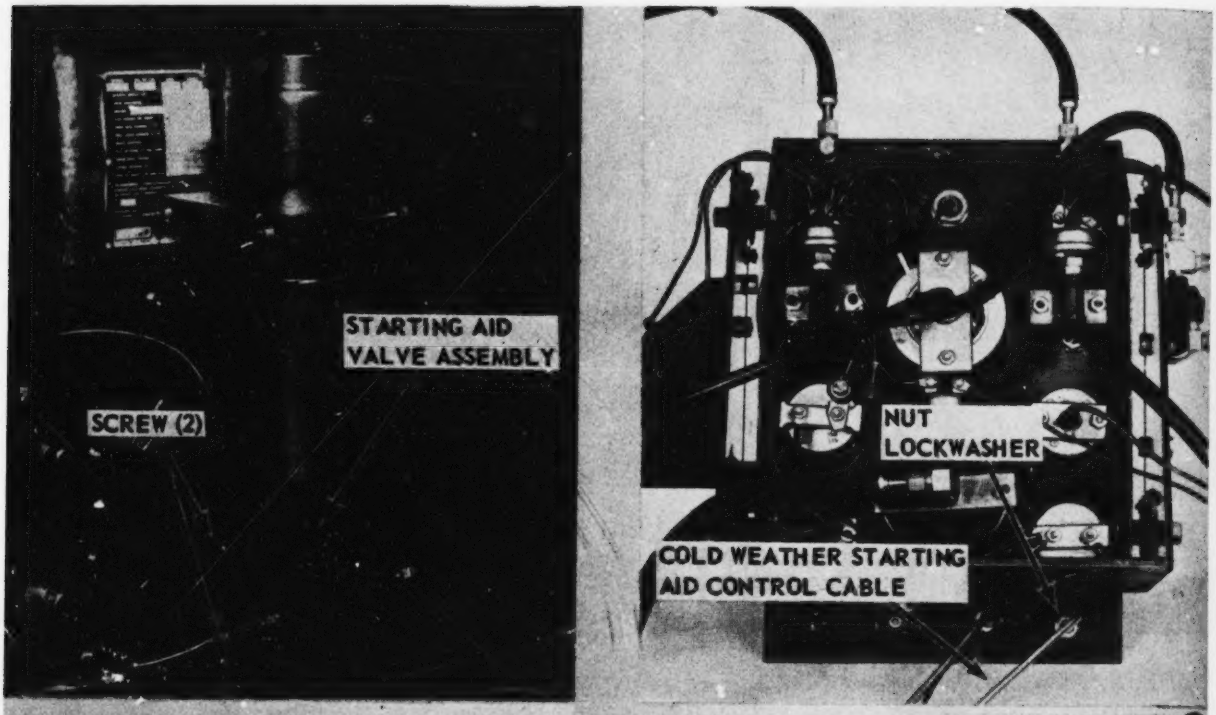
UNSCREW AND REMOVE AIR CLEANER RESTRICTION INDICATOR FROM INSTRUMENT PANEL.

INSTALLATION

SCREW AIR CLEANER RESTRICTION INDICATOR ONTO INSTRUMENT PANEL AND TIGHTEN.

K AIR CLEANER RESTRICTION INDICATORS; REMOVAL AND INSTALLATION.

Figure 3-34. Instrument Panel Controls and Instruments, Removal and Installation (sheet 6 of 8).


STARTING AID VALVE ASSEMBLY
SCREW (2)
NUT LOCKWASHER
COLD WEATHER STARTING AID CONTROL CABLE

ME 4310-338-15/3-34 ⑦

REMOVAL

STEP 1. LOOSEN SCREWS ON VALVE ASSEMBLY AND REMOVE CONTROL CABLE.

STEP 2. REMOVE NUT AND LOCKWASHER. REMOVE CONTROL CABLE.

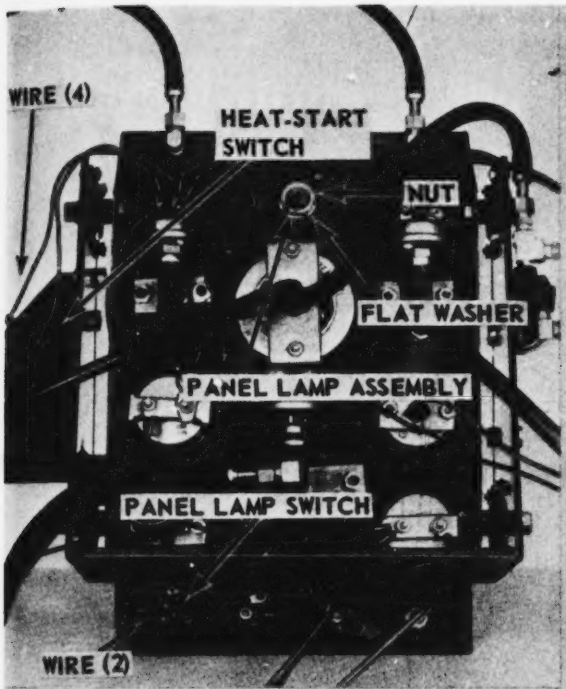
INSTALLATION

STEP 1. PLACE CONTROL CABLE IN MOUNTING POSITION AND SECURE WITH NUT AND LOCKWASHER.

STEP 2. INSTALL CABLE ON VALVE ASSEMBLY AND TIGHTEN SCREWS.

L COLD WEATHER STARTING AID CONTROL CABLE; REMOVAL AND INSTALLATION.

Figure 3-34. Instrument Panel Controls and Instruments, Removal and Installation (sheet 7 of 8).


WIRE (4)
HEAT-START SWITCH
NUT
FLAT WASHER
PANEL LAMP ASSEMBLY
PANEL LAMP SWITCH
WIRE (2)

REMOVAL

STEP 1. DISCONNECT WIRES.

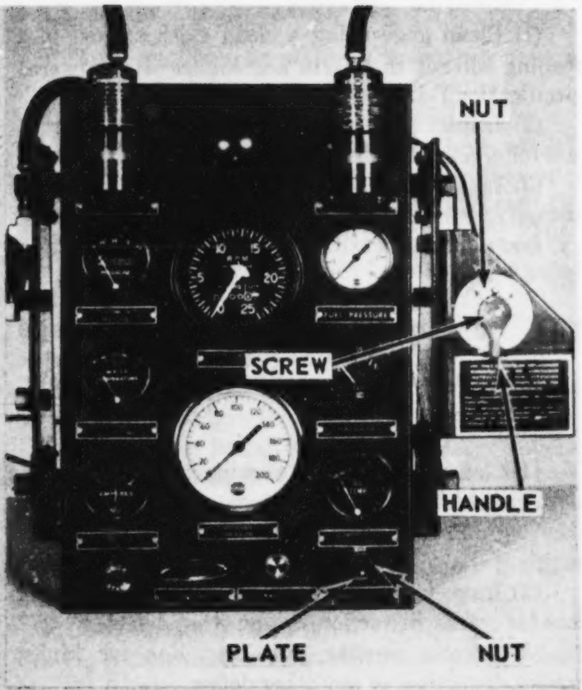
STEP 2. REMOVE SCREW, HANDLE, AND NUT. REMOVE SWITCH.

INSTALLATION

STEP 1. PLACE SWITCH IN MOUNTING POSITION AND SECURE WITH NUT. INSTALL HANDLE AND SECURE WITH SCREW.

STEP 2. CONNECT WIRES.

M HEAT-START SWITCH; REMOVAL AND INSTALLATION.


NUT
SCREW
HANDLE
PLATE
NUT

ME 4310-338-15/3-34 ⑧

REMOVAL

STEP 1. DISCONNECT WIRES FROM SWITCH.

STEP 2. REMOVE NUT AND FLAT WASHER. REMOVE PANEL LAMP ASSEMBLY.

STEP 3. REMOVE NUT. REMOVE SWITCH AND PLATE.

INSTALLATION

STEP 1. PLACE SWITCH AND PLATE ON INSTRUMENT PANEL AND SECURE WITH NUT.

STEP 2. PLACE PANEL LAMP ASSEMBLY ON INSTRUMENT PANEL AND SECURE WITH NUT AND FLAT WASHER.

STEP 3. CONNECT WIRES TO SWITCH.

N PANEL LAMP ASSEMBLY AND SWITCH; REMOVAL AND INSTALLATION.

Figure 3-34. Instrument Panel Controls and Instruments, Removal and Installation (sheet 8 of 8).

b. Cleaning and Inspection.

(1) Clean gage using a clean cloth soaked in a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Inspect gage face glass for damage. Inspect case for cracks, distortion, or any other defect.

(3) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. Installation. Install oil pressure gage as shown in figure 3-34.

3-47. Compressor Oil Temperature Gage

a. Removal. Remove oil temperature gage as shown in figure 3-34.

b. Cleaning and Inspection.

(1) Clean gage, line, and sensing bulb using a clean cloth soaked in a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Inspect gage face glass for damage. Inspect case for cracks, distortion, or any other defect.

(3) Inspect sensing bulb and line for kinks, breaks, distortion, or any other defect.

(4) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. Installation. Install oil temperature gage as shown in figure 3-34.

3-48. Compressor Oil Level Gage

a. Removal.

CAUTION

If drained oil is to be reused, take necessary precautions to prevent contamination.

(1) Drain oil from oil separator assembly until level is below gage mounting hole. Catch oil in a clean container if it is to be reused.

(2) Remove oil level gage as shown in figure 3-35.

b. Cleaning and Inspection.

(1) Clean gage using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry gage thoroughly.

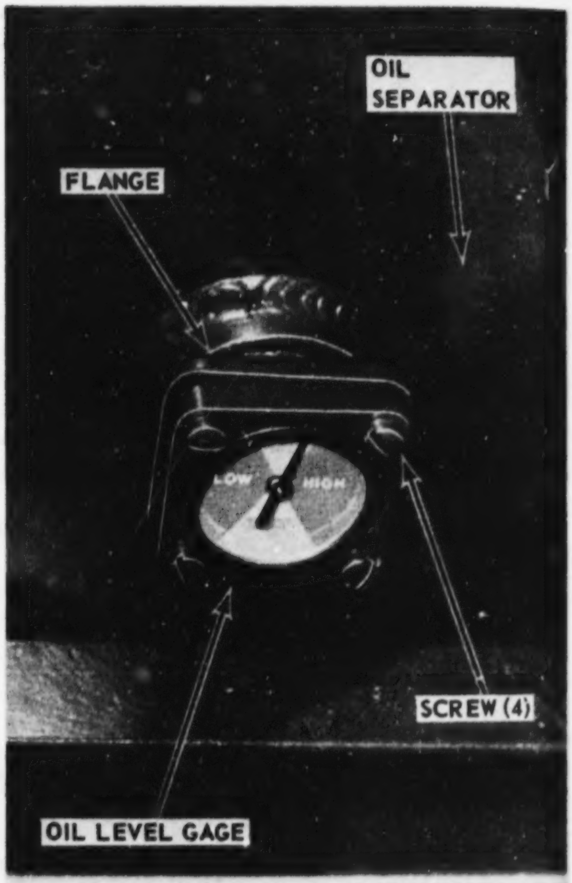
(2) Inspect oil level gage for freedom of movement, distortion, cracks, breaks, or any other defect. Inspect condition of face glass.

(3) Inspect attaching hardware for damaged threads, distortion, cracks, or any other defect.

c. Installation.

(1) Install oil level gage as shown in figure 3-35.

(2) Replenish oil supply (refer to LO 5-4310-338-12). If drained oil is being reused, check carefully for any obvious contamination; then strain oil as it is being added, using clean, lint-free cloth.



ME 4310-338-15/3-35

REMOVAL

STEP 1. REMOVE SCREWS. REMOVE GAGE.

STEP 2. UNSCREW AND REMOVE FLANGE.

INSTALLATION

STEP 1. INSTALL AND TIGHTEN FLANGE.

STEP 2. INSTALL GAGE AND SECURE WITH SCREWS.

Figure 3-35. Compressor oil level gage; removal and installation.

3-49. Tachometer-Hourmeter

a. Removal. Remove tachometer-hourmeter as shown in figure 3-34.

b. Cleaning and Inspection.

(1) Clean tachometer-hourmeter using a clean cloth soaked in a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Inspect tachometer-hourmeter face glass for damage. Inspect case for cracks, distortion, or any other defect.

(3) Inspect tachometer cable for kinks, breaks, or any other defect.

(4) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. *Installation.* Install tachometer-hourmeter as shown in figure 3-34.

3-50. Air Pressure Gage

a. *Removal.* Remove air pressure gage as shown in figure 3-34.

b. *Cleaning and Inspection.*

(1) Clean gage using a clean cloth soaked in a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Inspect gage face glass for damage. Inspect case for cracks, distortion, or any other defect.

(3) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. *Installation.* Install air pressure gage as shown in figure 3-34.

3-51. Fuel Level Gage

a. *Removal.* Remove fuel level gage and sending unit as shown in figure 3-34.

b. *Cleaning and Inspection.*

(1) Clean gage and sending unit using a clean cloth soaked in a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Inspect gage face glass for damage. Inspect case for cracks, distortion, or any other defect.

(3) Inspect sending unit float for freedom of movement. Inspect for cracks, breaks, distortion, or any other defect.

(4) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. *Installation.* Install fuel level gage and sending unit as shown in figure 3-34.

3-52. Fuel Pressure Gage

a. *Removal.* Remove fuel pressure gage as shown in figure 3-34.

b. *Cleaning and Inspection.*

(1) Clean gage using a clean cloth soaked in a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Inspect gage face glass for damage. Inspect case for cracks, distortion, or any other defect.

(3) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. *Installation.* Install fuel pressure gage as shown in figure 3-34.

3-53. Water Temperature Gage

a. *Removal.* Remove water temperature gage as shown in figure 3-34.

b. *Cleaning and Inspection.*

(1) Clean gage, line, and sensing bulb using a clean cloth soaked in a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Inspect gage face glass for damage. Inspect case for cracks, distortion, or any other defect.

(3) Inspect sensing bulb and line for kinks, breaks, distortion, or any other defect.

(4) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. *Installation.* Install water temperature gage as shown in figure 3-34.

3-54. Ammeter

a. *Removal.* Remove ammeter as shown in figure 3-34.

b. *Cleaning and Inspection.*

(1) Wipe ammeter clean using a clean, dry cloth.

(2) Inspect gage face glass for damage. Inspect case for cracks, distortion, or any other defect.

(3) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. *Installation.* Install ammeter as shown in figure 3-34.

NOTE

Be certain that ammeter terminals are tightened securely to provide a good charging circuit for the battery.

3-55. Air Cleaner Restriction Indicators

a. *Removal.* Remove air cleaner restriction indicators as shown in figure 3-34.

b. *Installation.* Install air cleaner restriction indicators as shown in figure 3-34.

3-56. Service Meter

a. *Removal.* Remove service meter from fuel transfer pump as shown in figure 3-36.

b. *Cleaning and Inspection.*

(1) Clean service meter using a clean cloth soaked in a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

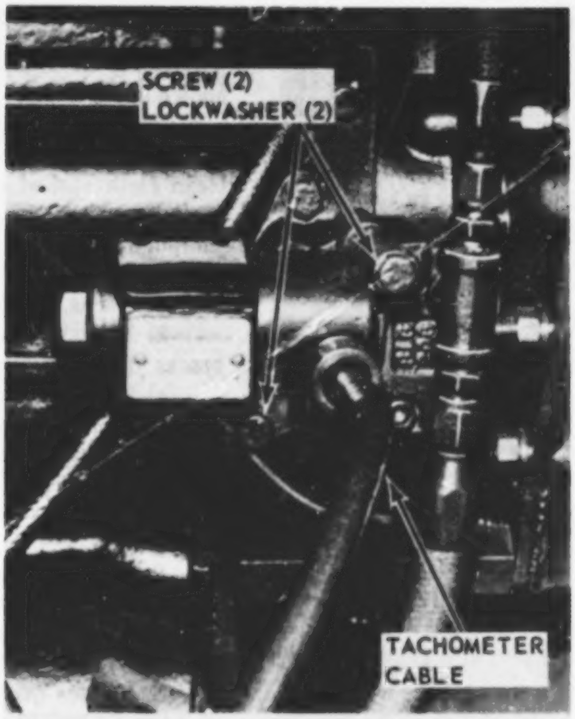
(2) Inspect service meter for cracks, breaks, distortion, or any other defect.

(3) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. *Installation.* Install service meter on fuel transfer pump as shown in figure 3-36.

3-57. Throttle RUN-START Lever

a. *Removal.* Remove throttle RUN-START lever as shown in figure 3-37.


SCREW (2)
LOCKWASHER (2)
TACHOMETER CABLE

ME 4310-338-15/3-36

REMOVAL

STEP 1. DISCONNECT TACHOMETER CABLE.

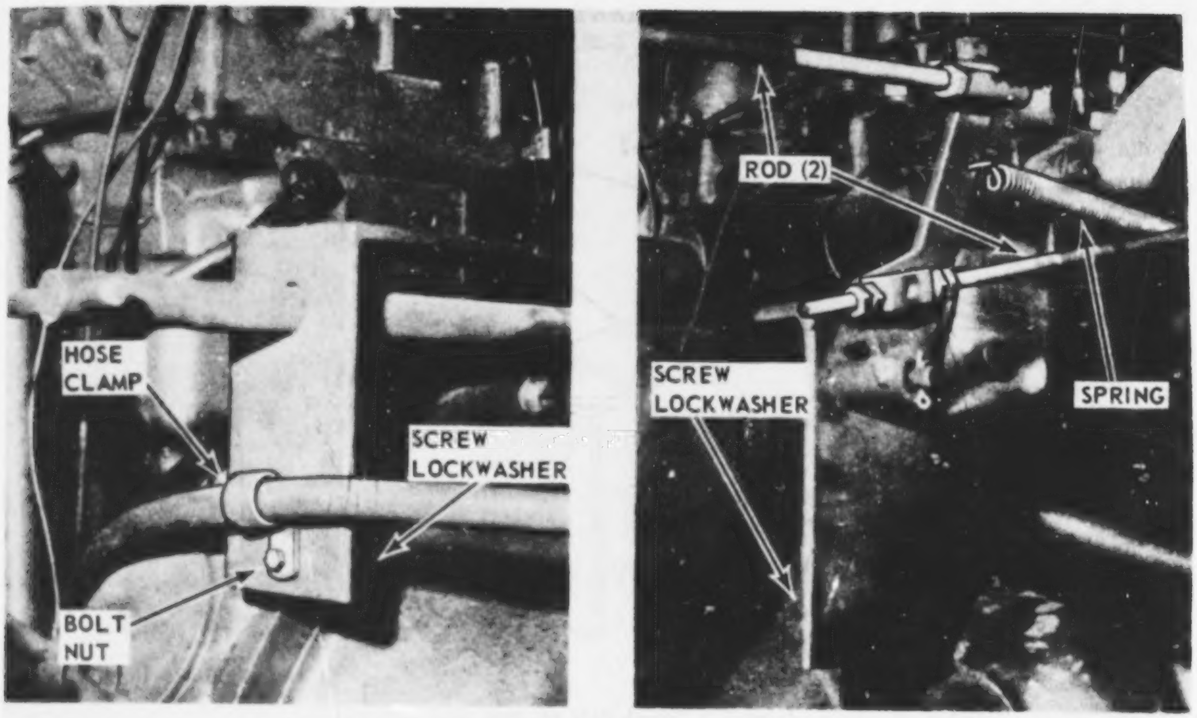
STEP 2. REMOVE SCREWS AND LOCKWASHERS. REMOVE SERVICE METER.

INSTALLATION

STEP 1. POSITION SERVICE METER AND INSTALL SCREWS AND LOCKWASHERS.

STEP 2. CONNECT TACHOMETER CABLE.

Figure 3-36. Service meter; removal and installation.


HOSE CLAMP
SCREW LOCKWASHER
BOLT NUT
ROD (2)
SCREW LOCKWASHER
SPRING

ME 4310-338-15 3-37

REMOVAL

STEP 1. REMOVE BOLT AND NUT SECURING HOSE CLAMP. REMOVE HOSE CLAMP.

STEP 2. DISCONNECT SPEED CONTROL RODS AND SPRING (FIGURE 3-68).

STEP 3. REMOVE MOUNTING SCREWS AND WASHERS. REMOVE RUN-START LEVER.

INSTALLATION

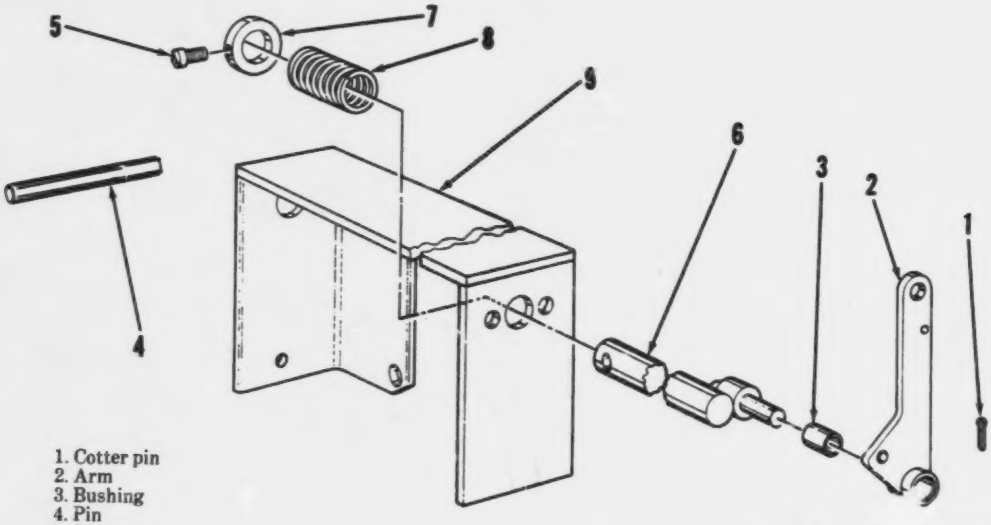
STEP 1. PLACE RUN-START LEVER IN MOUNTING POSITION AND SECURE WITH SCREWS AND WASHERS.

STEP 2. CONNECT SPEED CONTROL RODS AND SPRING (FIGURE 3-68).

STEP 3. POSITION HOSE CLAMP AND SECURE WITH BOLT AND NUT.

Figure 3-37. Throttle RUN-START lever; removal and installation.

b. Disassembly. Disassemble throttle RUN-START lever in numerical sequence shown in figure 3-38.



1. Cotter pin
2. Arm
3. Bushing
4. Pin
5. Screw
6 Shaft
7.Collar
8. Spring
9. Bracket

Figure 3-38. Throttle RUN-START lever; disassembly and reassembly.

c. Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect spring for cracked or broken coils, distortion, or any other defect.

(3) Inspect all other parts for cracks, breaks, distortion, or any other defects.

d. Reassembly. Reassemble throttle RUN-START lever in reverse numerical sequence shown in figure 3-38.

e. Installation. Install throttle RUN-START lever as shown in figure 3-37.

3-58. Fuel Rack Shutoff Solenoid

a. Removal. Remove fuel rack shutoff solenoid as shown in figure 3-39.

b. Installation. Install fuel rack shutoff solenoid as shown in figure 3-39.

3-59. Control Cables

a. Removal. Remove engine stop cable or cold weather starting aid cable as shown in figure 3-34.

b. Cleaning and Inspection.

(1) Clean control cables using a cleaning solvent that is in accordance with Federal specification P-D-680.

(2) Inspect cables for breaks, kinks, distortion, or any other defect.

(3) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. Installation. Install engine stop cable or cold weather starting aid cable as shown in figure 3-34.

3-60. HEAT-START Switch

a. Removal. Remove HEAT-START switch as shown in figure 3-34.

b. Cleaning and Inspection.

(1) Wipe HEAT-START switch clean using a clean, dry cloth.

(2) Check switch for proper operation. Inspect terminals for cracks, breaks, or any other defect.

(3) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. Installation. Install HEAT-START switch as shown in figure 3-34.

3-61. Panel Lamp Assembly and Switch

a. Removal. Remove panel lamp assembly and switch as shown in figure 3-34.

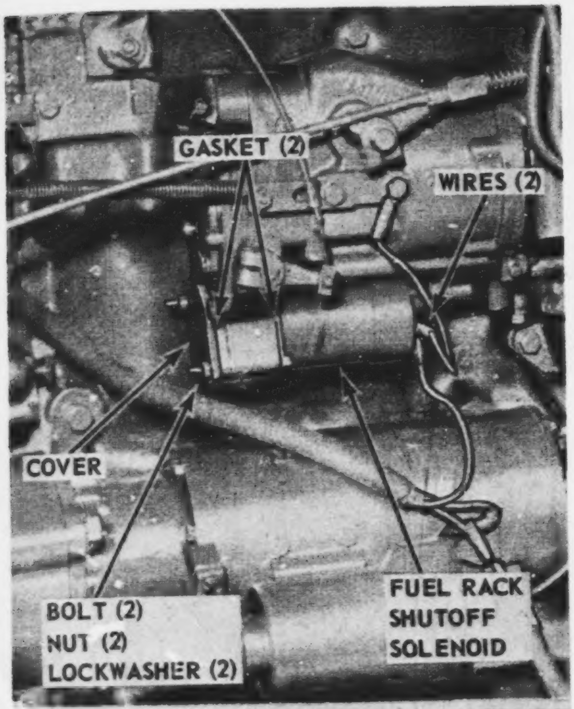
b. Cleaning and Inspection.

(1) Wipe panel lamp assembly and switch clean using a clean, dry cloth.

(2) Check switch for proper operation. Inspect terminals for cracks, breaks, or any other defect.

(3) Inspect panel lamp and bulb for breaks, cracks, distortion, or any other defect.

(4) Inspect attaching hardware for cracks, dis-



ME 4310-338-15/3-39

REMOVAL

STEP 1. DISCONNECT WIRING.

STEP 2. REMOVE BOLTS, NUTS, AND LOCKWASHERS.

STEP 3. REMOVE COVER AND GASKET.

STEP 4. TILT SOLENOID UP TO UNHOOK FROM LATCH AND REMOVE. REMOVE GASKET.

INSTALLATION

STEP 1. INSTALL SOLENOID AND GASKET. TILT UP AND HOOK SOLENOID ON LATCH.

STEP 2. INSTALL COVER AND GASKET.

STEP 3. INSTALL BOLTS, NUTS, AND LOCKWASHERS.

STEP 4. CONNECT WIRING.

Figure 3-39. Fuel rack shutoff solenoid, removal and installation.

tortion, damaged threads, or any other defect.

c. *Installation.* Install panel lamp assembly and switch as shown in figure 3-34.

3-62. Safety Pushbutton Switch

a. *Removal.* Remove safety pushbutton switch as shown in figure 3-34.

b. *Cleaning and Inspection.*

(1) Wipe safety switch clean using a clean, dry cloth.

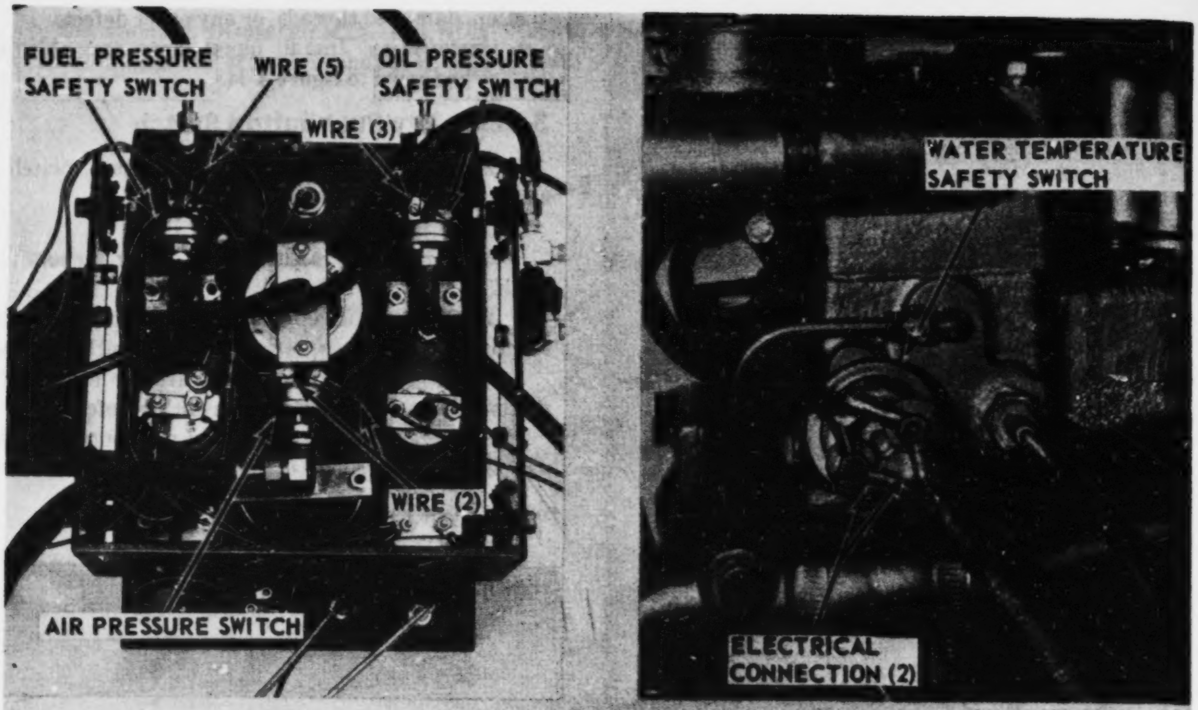
(2) Check switch for proper operation. Inspect terminals for cracks, breaks, or any other defect.

(3) Inspect attaching hardware for cracks, distortion, damaged threads, or any other defect.

c. *Installation.* Install safety pushbutton switch as shown in figure 3-34.

3-63. Fuel Pressure Safety Switch

a. *Removal.* Remove fuel pressure safety switch as shown in figure 3-40.


FUEL PRESSURE SAFETY SWITCH
WIRE (5)
OIL PRESSURE SAFETY SWITCH
WIRE (3)
WIRE (2)
AIR PRESSURE SWITCH
WATER TEMPERATURE SAFETY SWITCH
ELECTRICAL CONNECTION (2)
ME 4310-338-15/3-40

REMOVAL

STEP 1. DISCONNECT WIRES FROM SWITCH.

STEP 2. UNSCREW AND REMOVE SWITCH.

INSTALLATION

STEP 1. INSTALL AND TIGHTEN SWITCH.

STEP 2. CONNECT WIRES TO SWITCH (SEE FIGURE 1-3 FOR WIRING DIAGRAM).

A

REMOVAL

STEP 1. DISCONNECT ELECTRICAL CONNECTIONS.

STEP 2. UNSCREW AND REMOVE WATER TEMPERATURE SAFETY SWITCH.

INSTALLATION

STEP 1. INSTALL AND TIGHTEN WATER TEMPERATURE SAFETY SWITCH.

STEP 2. CONNECT ELECTRICAL CONNECTIONS.

B

Figure 3-40. Safety switches; removal and installation.

b. Installation. Install fuel pressure safety switch as shown in figure 3-40.

3-64. Air Pressure Switch

a. Removal. Remove air pressure switch as shown in figure 3-40.

b. Installation. Install air pressure switch as shown in figure 3-40.

3-65. Water Temperature Safety Switch

a. Removal. Remove water temperature safety switch as shown in figure 3-40.

b. Installation. Install water temperature safety switch as shown in figure 3-40.

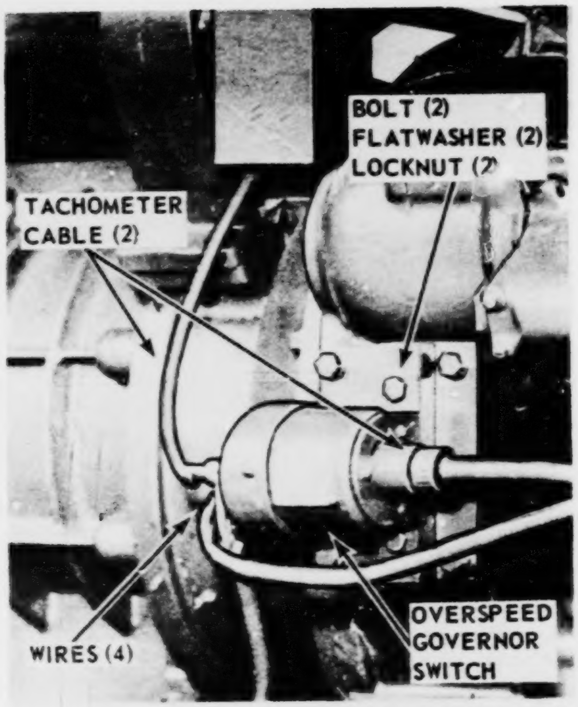
3-66. Oil Pressure Safety Switch

a. Removal. Remove oil pressure safety switch as shown in figure 3-40.

b. Installation. Install oil pressure safety switch as shown in figure 3-40.

3-67. Overspeed Governor Switch

a. Removal. Remove overspeed governor switch as shown in figure 3-41.


BOLT (2)
FLATWASHER (2)
LOCKNUT (2)
TACHOMETER CABLE (2)
WIRES (4)
OVERSPEED GOVERNOR SWITCH

ME 4310-338-15/3-41

REMOVAL

STEP 1. DISCONNECT WIRES.

STEP 2. DISCONNECT TACHOMETER CABLES.

STEP 3. REMOVE BOLTS, FLATWASHERS, AND LOCKNUTS. REMOVE OVERSPEED SWITCH.

INSTALLATION

STEP 1. POSITION OVERSPEED SWITCH. INSTALL BOLTS, FLATWASHERS, AND LOCKNUTS.

STEP 2. CONNECT TACHOMETER CABLES.

STEP 3. CONNECT WIRES TO NORMALLY OPEN (NO) TERMINALS.

Figure 3-41. Overspeed governor switch; removal and installation.

b. Installation. Install overspeed governor switch as shown in figure 3-41.

c. Test and Adjustment.

(1) Make a test setup as shown in figure 3-42. Connect tachometer adapter so that overspeed governor switch rotates at same speed as engine. In addition, use a tachometer that indicates exact speed of engine (1:1 ratio).

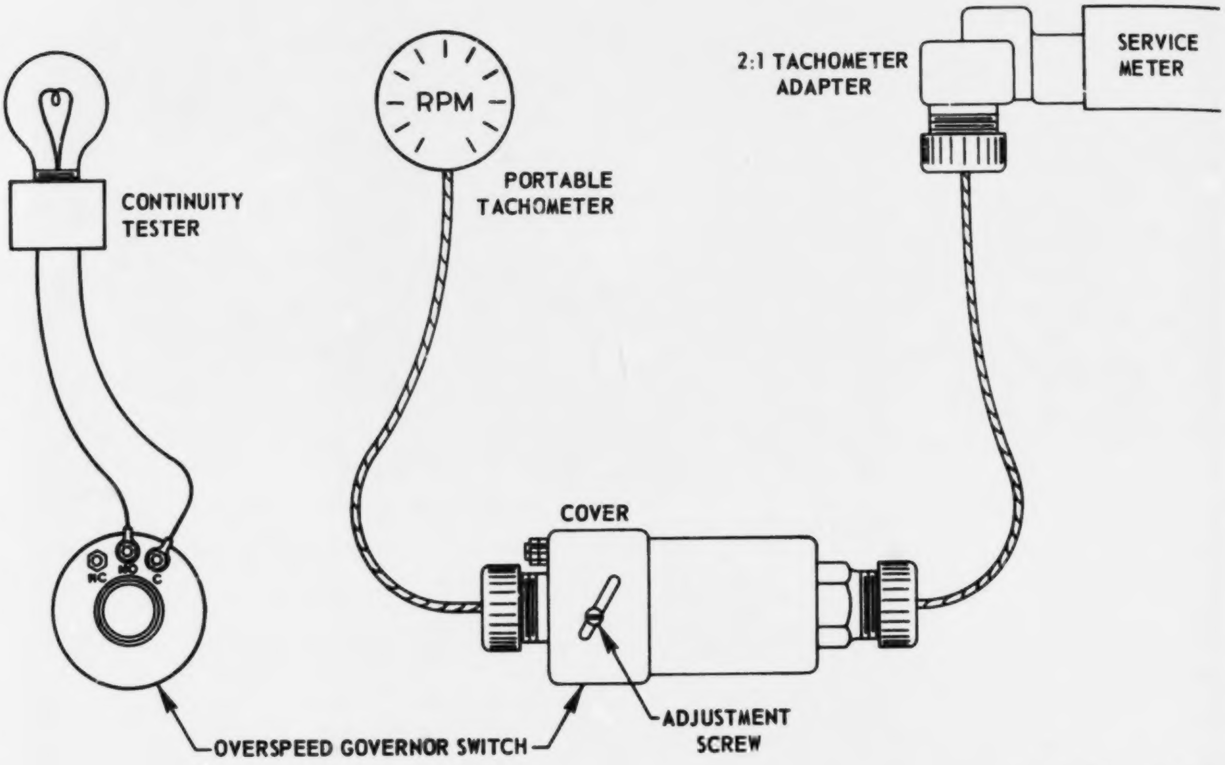


Figure 3-42. Overspeed governor switch adjustment setup.

(2) Start engine (para 2-9) and allow equipment to reach operating temperatures. Leave RUN-START lever in START position.

(3) Disconnect speed control linkage from governor control lever (fig. 3-68). Open 1 1/2" air discharge globe valve at rear of unit just enough to keep air pressure from exceeding 105 PSI, but not less than 80 PSI.

(4) Observe tachometer and manually increase engine speed until continuity tester lights. Lamp should light at 1000 -25 RPM (as indicated on the portable tachometer) if overspeed governor switch is properly adjusted. If switch is adjusted properly, proceed to step 7 below. If switch is not adjusted properly, proceed to step 5 below.

(5) Manually set engine speed to 1000 RPM indicated. Loosen lock screws on overspeed governor switch and turn cover to a position that just lights the continuity tester. Use reset button to open switch when necessary.

(6) Decrease engine speed to 900 RPM and depress reset button. Repeat step 4, above, to check switch setting. Tighten lock screws on cover.

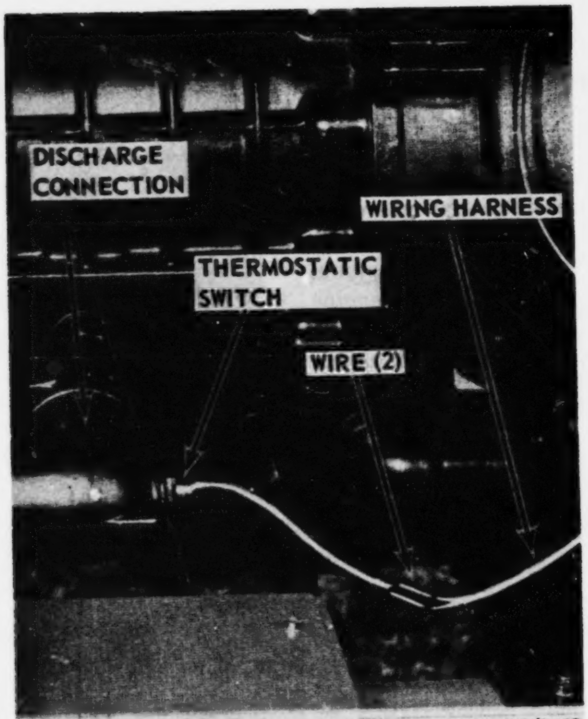
(7) When overspeed governor switch is adjusted properly, stop engine (fig. 2-9). Disconnect and remove portable tachometer, continuity tester, and tachometer adapter.

(8) Connect tachometer cables and wiring to overspeed governor switch. Connect speed control linkage (fig. 3-68).

3-68. Thermostatic Switch

a. Removal. Remove thermostatic switch as shown in figure 3-43.

b. Installation. Install thermostatic switch as shown in figure 3-43.


DISCHARGE CONNECTION
WIRING HARNESS
THERMOSTATIC SWITCH
WIRE (2)

ME 4310-338-15/3-43

REMOVAL

DISCONNECT THERMOSTATIC SWITCH WIRES FROM HARNESS. UNSCREW AND REMOVE THERMOSTATIC SWITCH.

INSTALLATION

INSTALL AND TIGHTEN THERMOSTATIC SWITCH. CONNECT WIRES TO HARNESS.

Figure 3-43. Thermostatic switch; removal and installation.

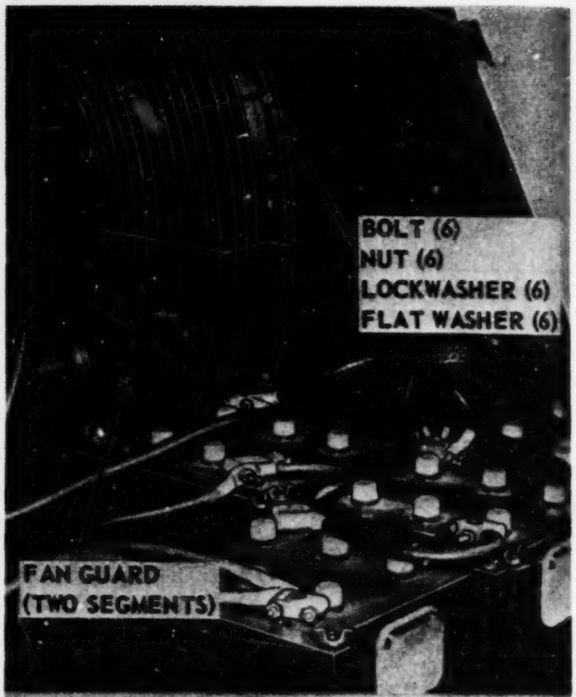
SECTION XII. COOLING SYSTEM

3-69. General

The air compressor unit cooling system consists of the radiator and oil cooler assembly, fan guard assembly, engine temperature regulator, fan assembly, fan drive group, drive belts, engine water pump, coolant lines, hoses, fittings and clamps. The engine has a pressure cooling system. An impeller-type pump circulates the coolant through the engine components and the radiator. Coolant temperature is reduced by ambient air which is drawn through the radiator core by the fan assembly. The engine temperature regulator controls the flow of coolant through the radiator. The ambient air pulled through the radiator also passes through an oil cooler which reduces the temperature of air compressor oil.

3-70. Fan Guard Assembly

a. Removal. Remove engine fan guard assembly as shown in figure 3-44.



ME 4310-338-15/3-44

REMOVAL

REMOVE BOLTS, NUTS, LOCKWASHERS, AND FLAT WASHERS. REMOVE BOTH SEGMENTS OF FAN GUARD.

INSTALLATION

PLACE EACH SEGMENT OF FAN GUARD IN MOUNTING POSITION. INSTALL AND TIGHTEN BOLTS, NUTS, LOCKWASHERS, AND FLAT WASHERS.

Figure 3-44. Fan guard assembly; removal and installation.

b. Cleaning and Inspection.

(1) Clean fan guard assembly using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

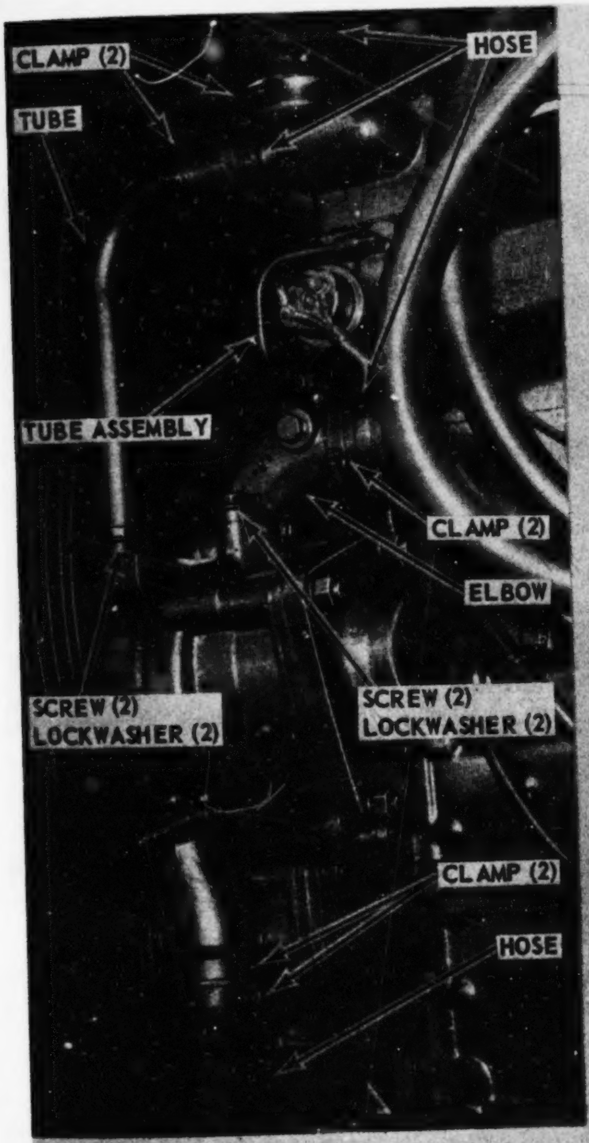
(2) Inspect fan guard for cracks, breaks, distortion, or any other defect.

(3) Inspect attaching hardware for damaged threads, cracks, distortion, or any other defect.

c. Installation. Install fan guard assembly as shown in figure 3-44.

3-71. Coolant Lines, Hoses, Fittings, and Clamps

a. Removal. Remove coolant lines, hoses, fittings, and clamps as shown in figure 3-45.



REMOVAL

STEP 1. REMOVE HOSE CLAMPS AND HOSES.

STEP 2. REMOVE TUBE ASSEMBLY FROM ELBOW AND CYLINDER HEAD.

STEP 3. REMOVE SCREWS AND LOCKWASHERS FROM ELBOW. REMOVE ELBOW.

STEP 4. REMOVE SCREWS AND LOCKWASHERS FROM TUBE AT FRONT OF WATER PUMP. REMOVE TUBE.

INSTALLATION

STEP 1. INSTALL TUBE TO FRONT OF WATER PUMP AND SECURE WITH SCREWS AND LOCKWASHERS.

STEP 2. INSTALL ELBOW AND SECURE WITH SCREWS AND LOCKWASHERS.

STEP 3. INSTALL TUBE ASSEMBLY TO ELBOW AND CYLINDER HEAD.

STEP 4. INSTALL HOSES AND SECURE WITH HOSE CLAMPS.

ME 4310-338-15/3-45

Figure 3-45. Coolant lines, hoses, and fittings, removal and installation.

b. Cleaning and Inspection.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect parts for inks, breaks, cracks, distortion, deterioration, or any other defect.

(3) Inspect attaching hardware for damaged threads, cracks, distortion, or any other defect.

c. Installation. Install coolant lines, hoses, fittings and clamps as shown in figure 3-45.

3-72. Drive Belts

a. Removal.

(1) Remove fan guard assembly (para 3-70).

(2) Remove drive belts as shown in figure 3-46.

REMOVAL

STEP 1. LOOSEN SCREW SECURING GENERATOR TO PIVOT.

STEP 2. LOOSEN BOLT SECURING GENERATOR TO ADJUSTING STRAP.

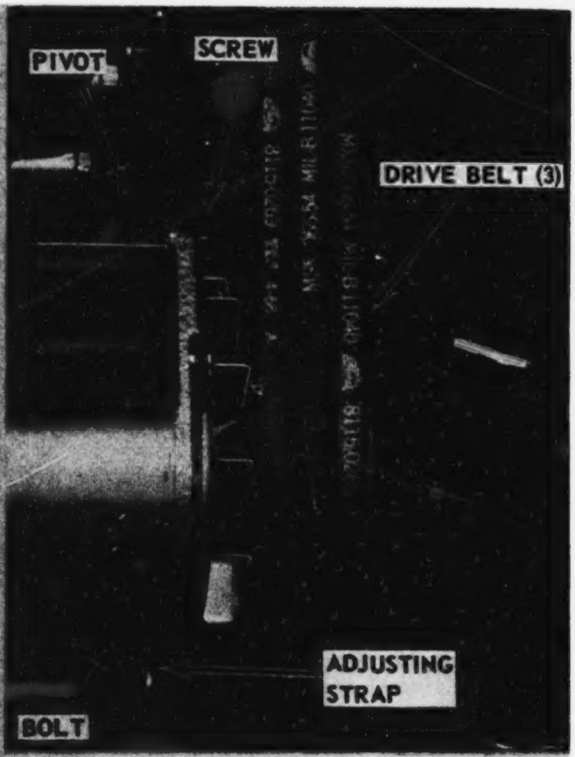
STEP 3. MOVE GENERATOR IN DIRECTION TO LOOSEN DRIVE BELTS. REMOVE DRIVE BELTS BY WEAVING THEM OVER FAN BLADES.

INSTALLATION

STEP 1. INSTALL DRIVE BELTS BY WEAVING THEM OVER FAN BLADES. POSITION BELTS ON PULLEYS.

STEP 2. MOVE GENERATOR IN DIRECTION TO TIGHTEN DRIVE BELTS AND SECURE BY TIGHTENING BOLT ON ADJUSTING STRAP.

STEP 3. TIGHTEN SCREW SECURING GENERATOR TO PIVOT.



ME 4310-338-15/3-46

NOTE

ADJUST DRIVE BELT TENSION AS INSTRUCTED IN FIGURE 3-47.

Figure 3-46. Drive belts; removal and installation.

b. Inspection. Inspect drive belts for cracks, breaks, fraying, excessive wear, or any other defect.

NOTE

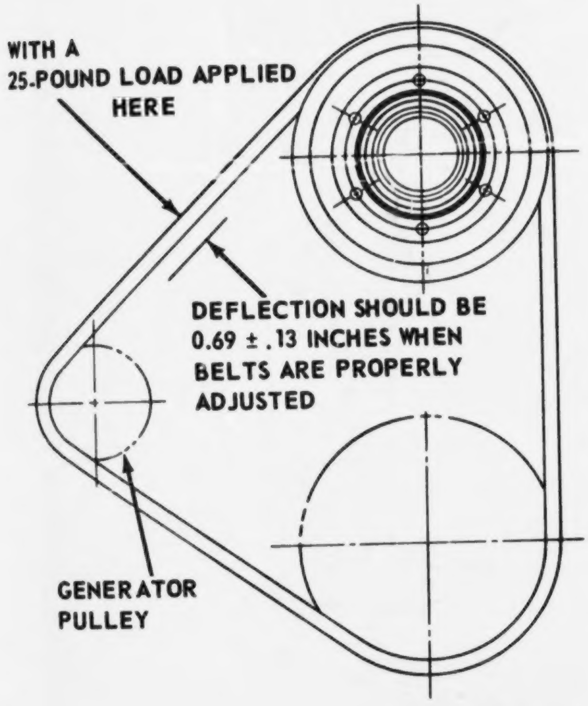
Always replace drive belts in sets.

c. Installation.

(1) Install drive belts as shown in figure 3-46.

(2) Install fan guard assembly (para 3-70).

d. Adjustment. When tightening generator assembly, adjust drive belts as shown in figure 3-47.


WITH A 25-POUND LOAD APPLIED HERE
DEFLECTION SHOULD BE 0.69 ± .13 INCHES WHEN BELTS ARE PROPERLY ADJUSTED
GENERATOR PULLEY

ME 4310-338-15/3-47

Figure 3-47. Drive belt tension adjustment.

3-73. Radiator and Oil Cooler Assembly

a. Removal.

(1) Remove housing components necessary for removal of radiator and oil cooler assembly (para 3-33).

(2) Remove fan guard assembly (para 3-70).

(3) Drain coolant from radiator.

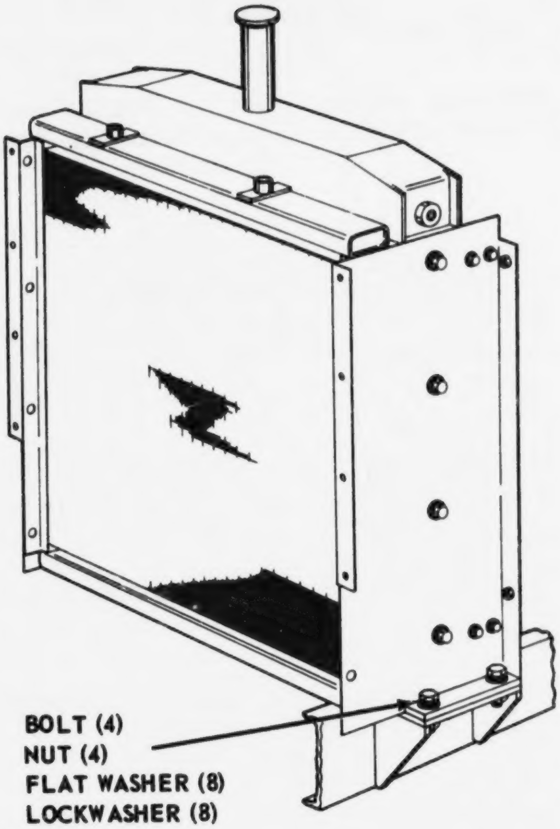
(4) Remove coolant lines, hoses, fittings, and clamps (para 3-71).

(5) Remove radiator and oil cooler assembly as shown in figure 3-48.

b. Installation.

(1) Install radiator and oil cooler assembly as shown in figure 3-48.

(2) Install coolant lines, hoses, fittings, and clamps (para 3-71).



ME 4310-338-15/3-48

Figure 3-48. Radiator and oil cooler assembly; removal and installation.

(3) Install fan guard assembly (para 3-70).

(4) Install housing components (para 3-33).

(5) Replenish radiator coolant supply.

3-74. Fan Assembly

a. Removal.

(1) Remove fan guard assembly (para 3-70).

(2) Remove drive belts (para 3-72).

(3) Remove fan assembly as shown in figure 3-49.

b. Cleaning and Inspection.

(1) Clean fan assembly using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Inspect fan assembly for cracks, bent blades, or any other defect.

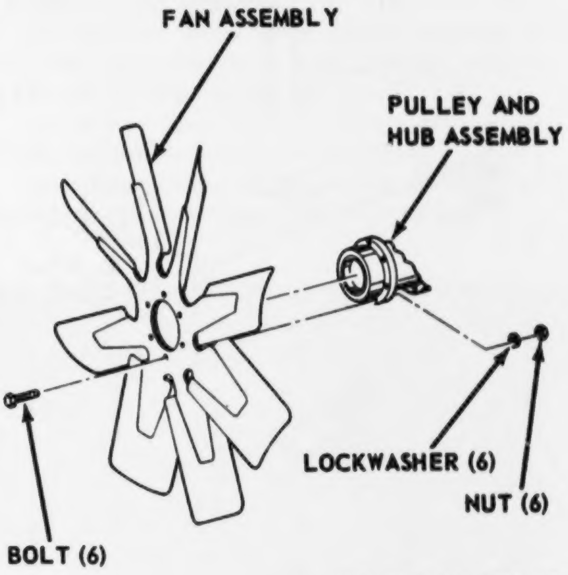
(3) Inspect attaching hardware for damaged threads, cracks, distortion, or any other defect.

c. Installation.

(1) Install fan assembly as shown in figure 3-49.

(2) Install drive belts (para 3-72). Adjust belts (fig. 3-47).

(3) Install fan guard assembly (para 3-70).



REMOVAL

REMOVE BOLTS, NUTS, AND LOCKWASHERS. REMOVE FAN ASSEMBLY FROM HUB.

INSTALLATION

PLACE FAN ASSEMBLY ON HUB AND SECURE WITH BOLTS, NUTS, AND LOCKWASHERS.

Figure 3-49. Fan assembly; removal and installation.

3-75. Engine Temperature Regulator

a. Removal.

(1) Drain engine cooling system.

(2) Remove hose and clamps from engine temperature regulator cover assembly (para 3-71).

(3) Remove engine temperature regulator by following numerical sequence shown in figure 3-50. Discard gasket and seal.

b. Testing.

(1) Make test setup as shown in figure 3-51.

(2) Apply heat to pan and stir water to maintain uniform water temperature.

(3) Observe temperature of water when regulator opens. The opening temperature should be 169° to 171 ° F. The regulator should be fully open at approximately 185° F.

c. Installation.

(1) Install engine temperature regulator by following reverse numerical sequence shown in figure 3-50. Install a new gasket and seal.

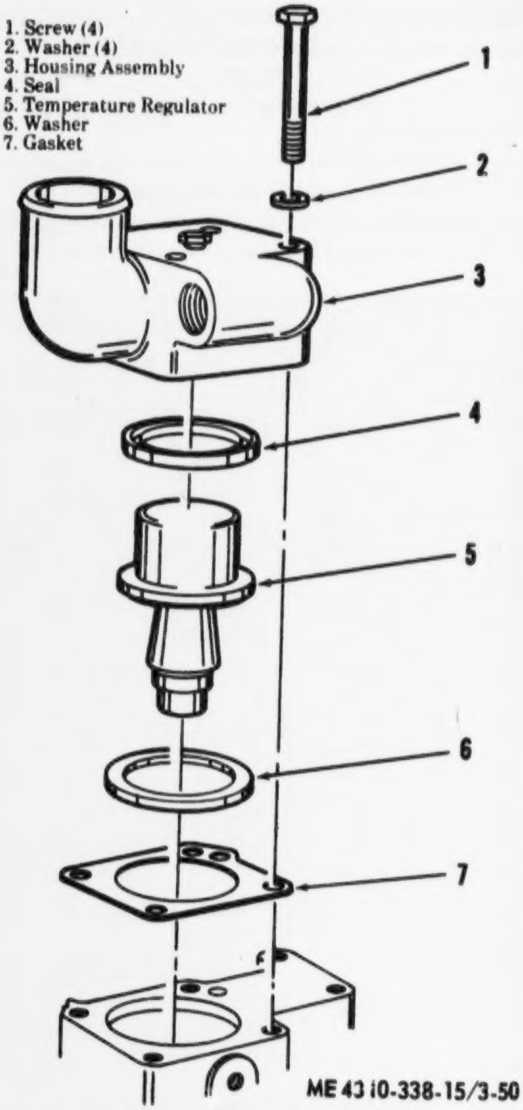

1. Screw (4)
2. Washer (4)
3. Housing Assembly
4. Seal
5. Temperature Regulator
6. Washer
7. Gasket

Figure 3-50. Engine temperature regulator; removal and installation.

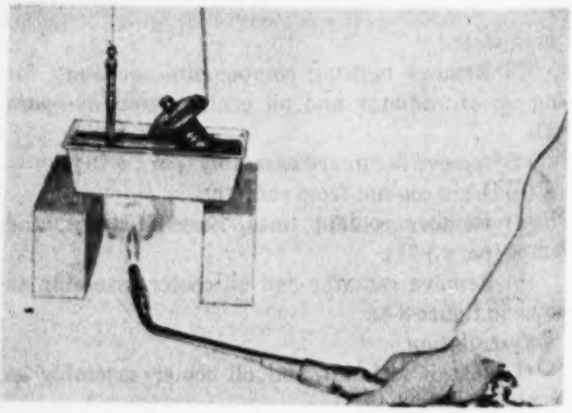


Figure 3-51. Engine temperature regulator test setup.

NOTE

Clean sealing surfaces before installing gasket and cover assembly.

(2) Install radiator hose and clamps on temperature regulator cover assembly (para 3-71).

(3) Replenish engine coolant.

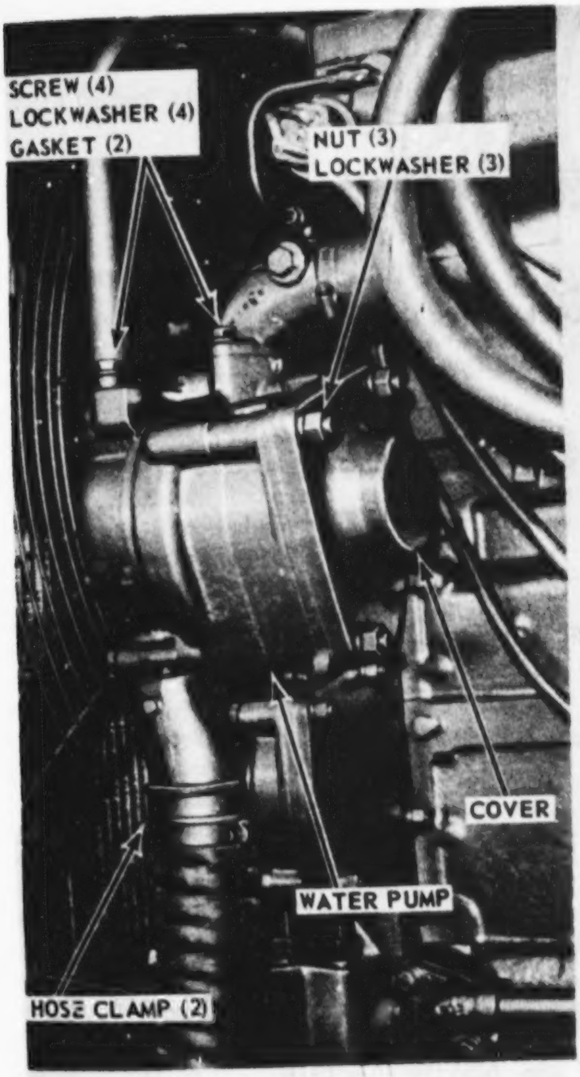
3-76. Water Pump Assembly

a. Removal.

(1) Drain cooling system.

(2) Remove fan guard assembly (para 3-70).

(3) Remove water pump assembly as shown in figure 3-52. Discard gaskets.



REMOVAL

STEP 1. LOOSEN HOSE CLAMPS AT THREE LOCATIONS ON WATER PUMP ASSEMBLY. DISCONNECT HOSES.

STEP 2. DISCONNECT WATER TUBE ASSEMBLY AT TOP OF ELBOW. REMOVE CONNECTOR.

STEP 3. REMOVE NUTS AND LOCKWASHERS. REMOVE COVER AND WATER PUMP ASSEMBLY.

INSTALLATION

STEP 1. INSTALL WATER PUMP ASSEMBLY AND COVER. INSTALL NUTS AND LOCKWASHERS.

STEP 2. CONNECT HOSES AND TIGHTEN HOSE CLAMPS AT THREE LOCATIONS ON WATER PUMP ASSEMBLY.

STEP 3. INSTALL CONNECTOR AT TOP OF ELBOW. CONNECT WATER TUBE ASSEMBLY.

ME 4310-338-15/3-52

Figure 3-52. Water pump assembly; removal and installation.

b. Installation.

(1) Install water pump assembly as shown in figure 3-52. Install new gaskets.

(2) Install fan guard assembly (para 3-70).

(3) Replenish engine coolant.

3-77. Fan Drive Group

a. Removal.

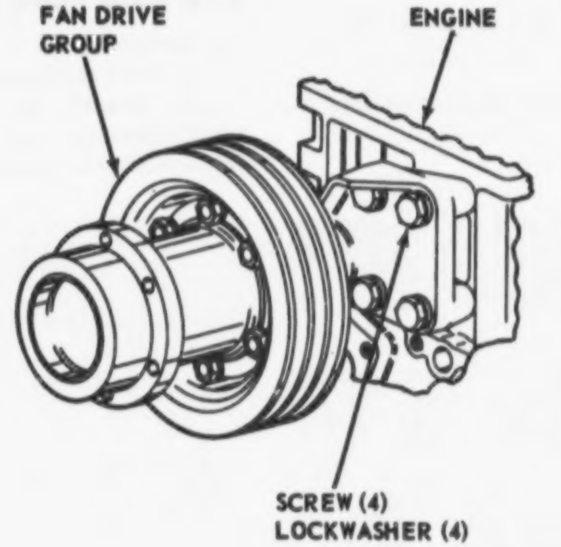
(1) Remove radiator and cooler assembly (para 3-73).

(2) Remove drive belts (para 3-72).

(3) Remove fan assembly (para 3-74).

(4) Remove fan drive group as shown in figure 3-53.

b. Disassembly. Disassemble fan drive group in numerical sequence shown in figure 3-54.


FAN DRIVE GROUP
ENGINE
SCREW (4)
LOCKWASHER (4)

ME 4310-338-15/3-53

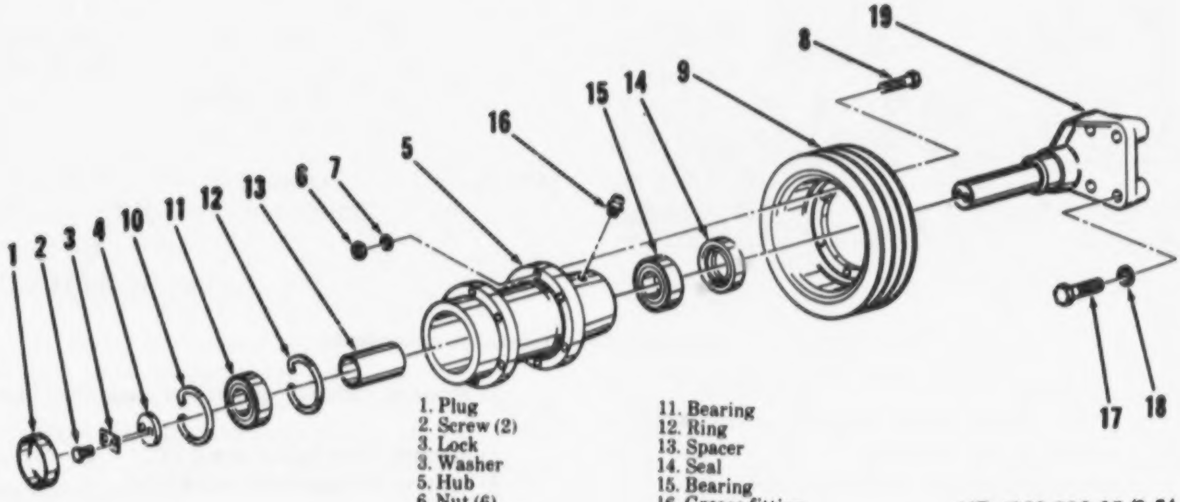
REMOVAL

REMOVE SCREWS AND LOCKWASHERS. REMOVE FAN DRIVE GROUP.

INSTALLATION

PLACE FAN DRIVE GROUP IN MOUNTING POSITION AND SECURE WITH SCREWS AND LOCKWASHERS.

Figure 3-53. Fan drive group; removal and installation.


19
8
9
15
14
16
5
7
6
13
12
11
10
4
3
2
1
17
18

1. Plug
2. Screw (2)
3. Lock
3. Washer
5. Hub
6. Nut (6)
7. Washer (6)
8. Bolt (6)
9. Pulley
10. Retaining ring
11. Bearing
12. Ring
13. Spacer
14. Seal
15. Bearing
16. Grease fitting
17. Screw (4)
18. Washer (4)
19. Shaft assembly

ME 4310-338-15/3-54

Figure 3-54. Fan drive group; disassembly and reassembly.

c. Cleaning and Inspection.

(1) Clean parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect bearings for excessive wear, freedom of movement, distortion, or any other defect.

(3) Inspect seal for excessive wear, cracks, distortion, or any other defect.

(4) Inspect pulley for distortion, cracks, or any other defect.

(5) Inspect all other parts for cracks, breaks, distortion, or any other defects.

d. Reassembly. Reassemble fan drive group in reverse numerical sequence shown in figure 3-54.

e. Installation.

(1) Install fan drive group as shown in figure 3-53.

(2) Install fan assembly (para 3-74).

(3) Install drive belts (para 3-72).

(4) Install radiator and cooler assembly (para 3-73).

Section XIII. AIR COMPRESSOR SYSTEM

3-78. General

The air compressor system consists of the air cleaner, a single-stage air compressor assembly, oil separator assembly, blowdown valve assembly, minimum pressure valve, thermal bypass valve, speed control linkage, moisture separator, air pressure regulator, and oil filter. Free air is drawn through the air cleaner into the compressor intake control. A valve in the intake control opens and closes to allow air into the compressor stator according to the discharge air demand. When the valve is completely closed, the compressor is running unloaded. When the compressor is stopped, this same valve closes to prevent oil and air from the stator from being vented to the atmosphere. The speed control linkage is also connected to the intake control valve and moves the engine throttle to increase or decrease RPM as required to maintain the rated air output. A single-stage rotor-stator assembly develops an air output of 600 CFM at a discharge pressure of 100 PSI. The oil separator assembly contains a labyrinth and filter arrangement which separates the oil from the air before the air passes through the minimum pressure valve. The minimum pressure valve consists of a valve, spring, and piston arrangement which maintains a minimum air pressure of 40 PSI within the oil separator when the compressor is running. This minimum air pressure is necessary to produce proper oil circulation in the system and efficient air/oil separation. See figure 3-55. The valve is held closed by the piston and spring until air pressure reaches approximately 40 PSI, at which time the force of the air pressure moves the valve open and the piston upward, allowing compressed air to flow to the air discharge valves. When air pressure drops below 40 PSI, the force of the spring overcomes air pressure and moves the piston downward closing the valve. The blowdown valve automatically relieves air pressure from the system immediately after compressor shutdown. The safety valve opens automatically if the air pressure should exceed 125 PSI. The pressure regulator is connected between the oil separator and the intake-control. As the air load demand increases, the regulator controls a flow of air into the intake-control to open the valve. This action increases air input and engine speed. As the air pressure reaches the rated value, the pressure regulator causes the valve to close and the engine to return to the low idle speed. A moisture separator removes moisture from the air which controls the intake-control valve.

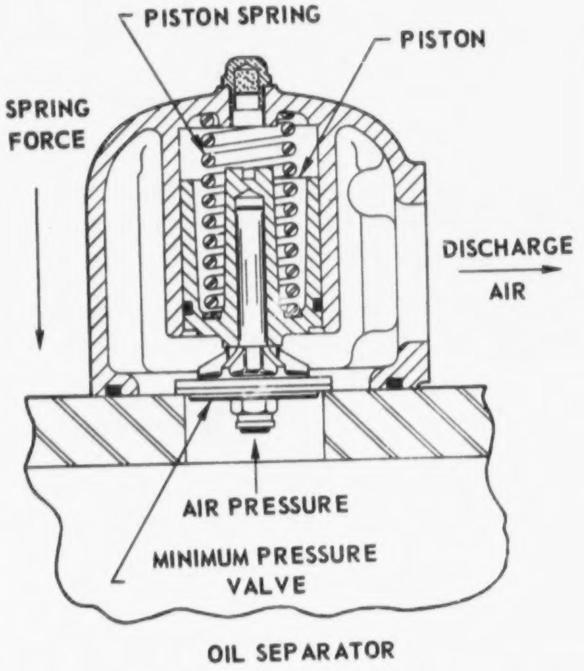
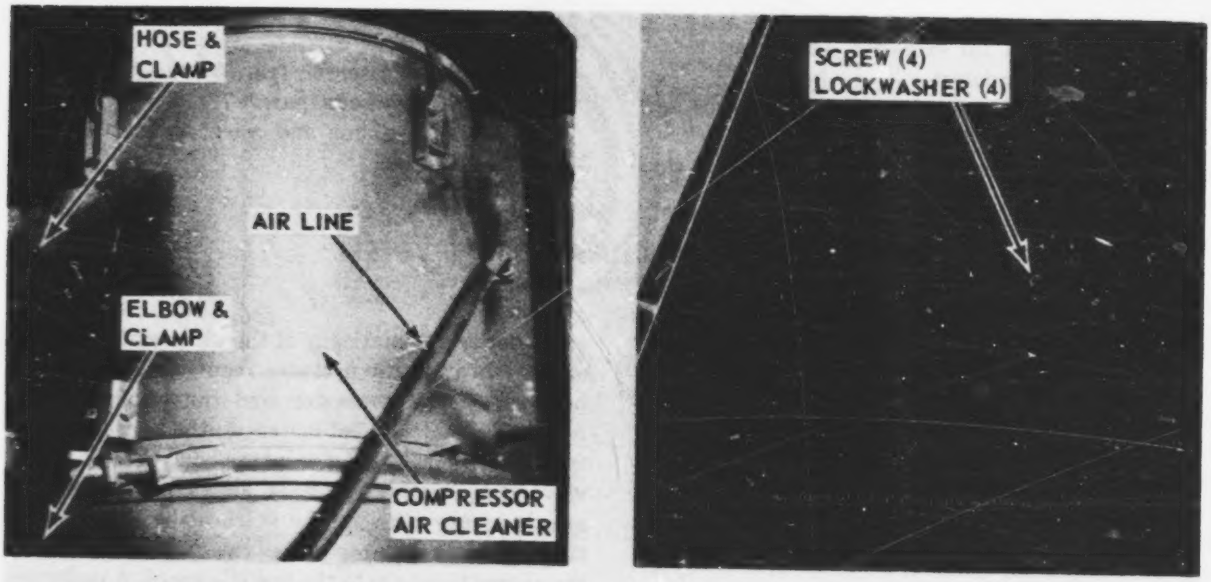


Figure 3-55. Operation of minimum pressure valve.

3-79. Compressor Air Cleaner Assembly

a. Removal. Remove compressor air cleaner as shown in figure 3-56.


HOSE & CLAMP
AIR LINE
ELBOW & CLAMP
COMPRESSOR AIR CLEANER
SCREW (4)
LOCKWASHER (4)

ME 4310-338-15/3-56

REMOVAL

STEP 1. DISCONNECT RESTRICTION INDICATOR AIR LINE.

STEP 2. LOOSEN HOSE CLAMP AND DISCONNECT INTAKE ELBOW FROM LOWER SECTION OF AIR CLEANER.

STEP 3. LOOSEN HOSE CLAMP AND DISCONNECT INTAKE HOSE FROM UPPER SECTION OF AIR CLEANER.

STEP 4. REMOVE SCREWS AND LOCKWASHERS. REMOVE AIR CLEANER.

INSTALLATION

STEP 1. POSITION AIR CLEANER AND SECURE WITH SCREWS AND LOCKWASHERS.

STEP 2. CONNECT INTAKE ELBOW AND HOSE TO AIR CLEANER AND SECURE WITH HOSE CLAMPS.

STEP 3. CONNECT RESTRICTION INDICATOR AIR LINE.

Figure 3-56. Compressor air cleaner; removal and installation.

b. Disassembly. Disassemble compressor air cleaner in numerical sequence shown in figure 3-57.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Clean air cleaner element as follows:

CAUTION

Compressed air used in following step should not exceed 100 PSI.

(a) Direct dry, clean compressed air to inside of element so that dust is blown outside. Move air stream up and down along pleats while slowly rotating element. Continue until no more dust is being removed. If further cleaning is required, proceed to step *(b)* below; otherwise proceed to step (3).

(b) Mix a good nonsudsing detergent with lukewarm water in a suitable container. Soak element in detergent for at least 15 minutes, then agitate element for two minutes to loosen dirt.

CAUTION

Water pressure used in following step should not exceed 40 PSI.

(c) After cleaning element with detergent, use a fresh water source and flush clean water through element from inside to outside. Continue to rinse element until water coming through to outside is clear and free from any detergent. Repeat step *(a)* above to dry element.

(3) Inspect element for dirt, rupture, pin holes, or any other defect. A good method of inspection is to place a light inside element and look toward light from outside. Any hole in element, even the smallest, will pass dust and cause unnecessary equipment wear.

(4) Inspect cap for cracks, breaks, distortion, or any other damage.

(5) Inspect hoses for cracks, breaks, deterioration, or any other defect.

(6) Inspect gaskets and O-ring for cracks, breaks, deterioration, or any other defect.

(7) Inspect body and cup for cracks, dents, distortion, or any other defect.

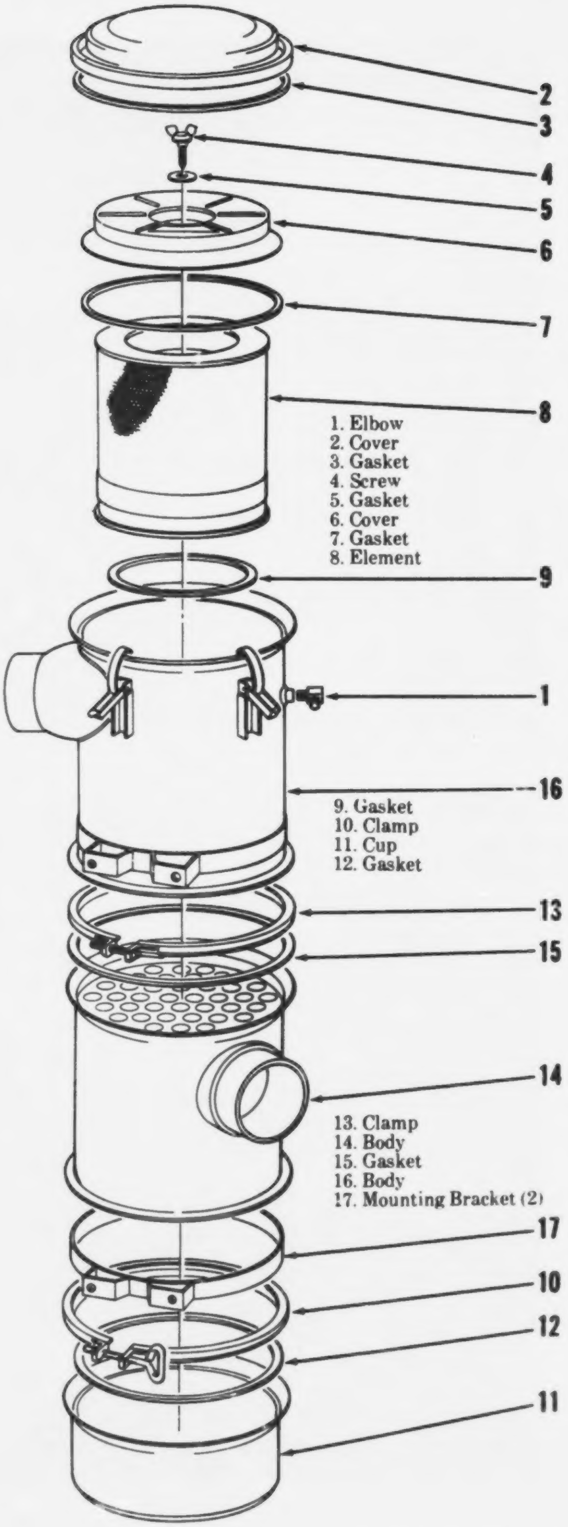
(8) Inspect attaching hardware, including clamps, for damaged threads, distortion, cracks, or any other defect.

d. Reassembly. Reassemble compressor air cleaner in reverse numerical sequence shown in figure 3-57.

e. Installation. Install compressor air cleaner as shown in figure 3-56.

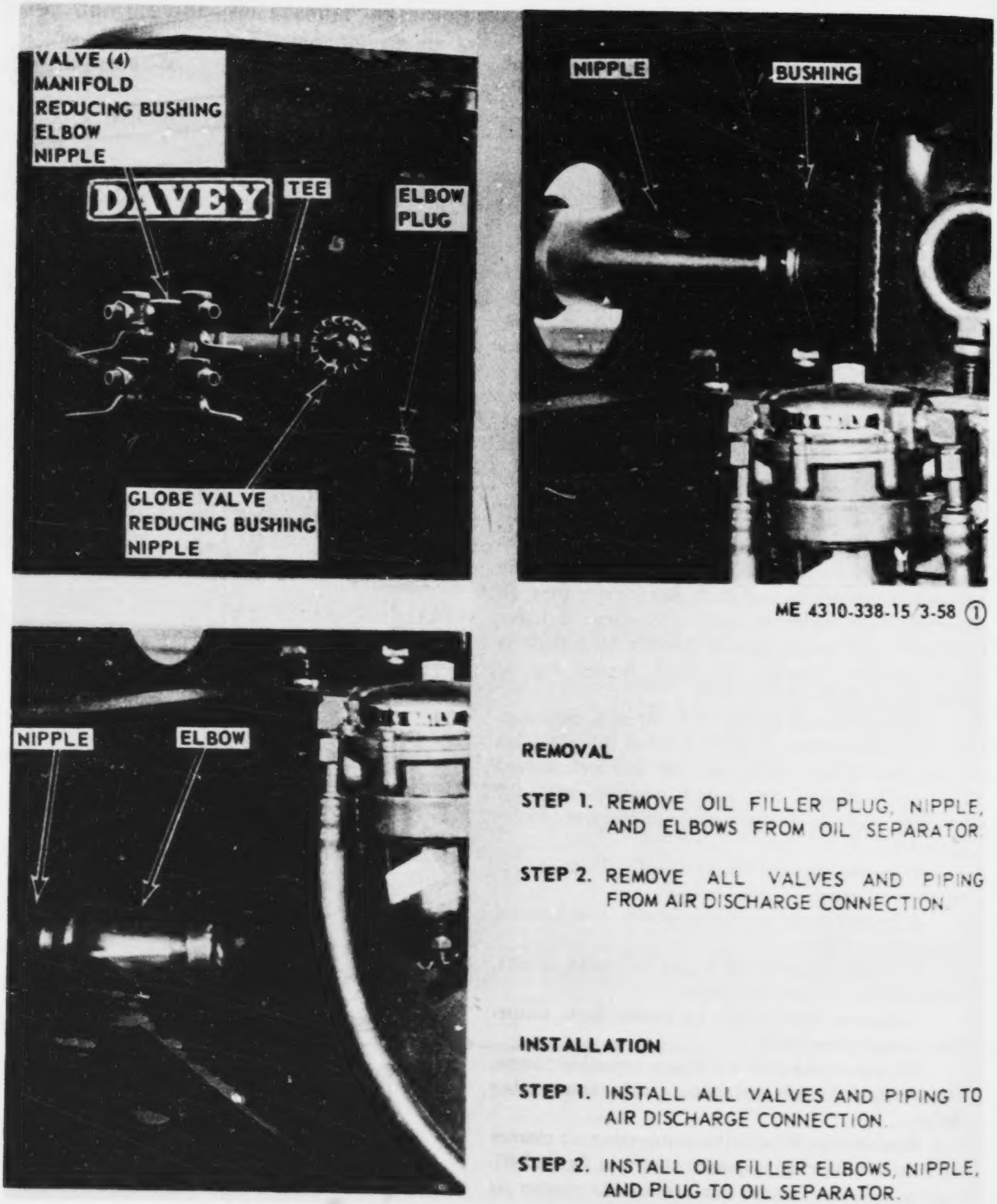
3-80. Air Discharge Connections, Service Valves, and Piping

a. Removal. Remove air discharge connections, service valves, and piping as shown in figure 3-58.



ME 4310-338-15/3-57

Figure 3-57. Compressor air cleaner; disassembly and reassembly.


VALVE (4)
MANIFOLD
REDUCING BUSHING
ELBOW
NIPPLE
DAVEY
TEE
ELBOW
PLUG
GLOBE VALVE
REDUCING BUSHING
NIPPLE
NIPPLE
BUSHING
NIPPLE
ELBOW

ME 4310-338-15/3-58 ①

REMOVAL

STEP 1. REMOVE OIL FILLER PLUG, NIPPLE, AND ELBOWS FROM OIL SEPARATOR.

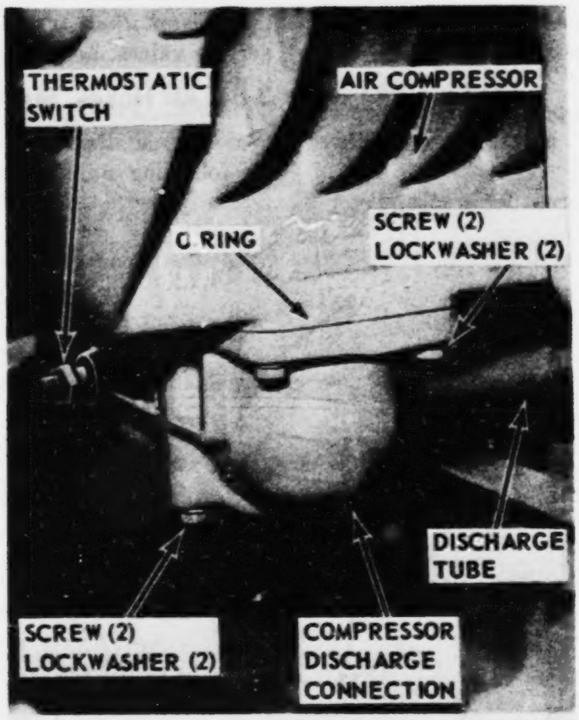
STEP 2. REMOVE ALL VALVES AND PIPING FROM AIR DISCHARGE CONNECTION.

INSTALLATION

STEP 1. INSTALL ALL VALVES AND PIPING TO AIR DISCHARGE CONNECTION.

STEP 2. INSTALL OIL FILLER ELBOWS, NIPPLE, AND PLUG TO OIL SEPARATOR.

Figure 3-58. Air Discharge Connections, Service Valves, and Piping, Removal and Installation (sheet 1 of 2).


THERMOSTATIC SWITCH
AIR COMPRESSOR
O RING
SCREW (2)
LOCKWASHER (2)
DISCHARGE TUBE
SCREW (2)
LOCKWASHER (2)
COMPRESSOR DISCHARGE CONNECTION

ME 4310-338-15/3-58 ②

REMOVAL

STEP 1. REMOVE THERMOSTATIC SWITCH.

STEP 2. REMOVE SCREWS AND LOCKWASHERS. SLIDE DISCHARGE CONNECTION FROM DISCHARGE TUBE.

STEP 3. REMOVE O-RING FROM BETWEEN DISCHARGE CONNECTION AND BASE OF COMPRESSOR.

INSTALLATION

STEP 1. INSTALL O-RING BETWEEN DISCHARGE CONNECTION AND BASE OF COMPRESSOR.

STEP 2. SLIDE DISCHARGE CONNECTION ON DISCHARGE TUBE. POSITION DISCHARGE CONNECTION AGAINST BASE OF COMPRESSOR AND INSTALL SCREWS AND LOCKWASHERS.

STEP 3. INSTALL THERMOSTATIC SWITCH.

Figure 3-58. Air Discharge Connections, Service Valves, and Piping, Removal and Installation (sheet 2 of 2).

b. Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

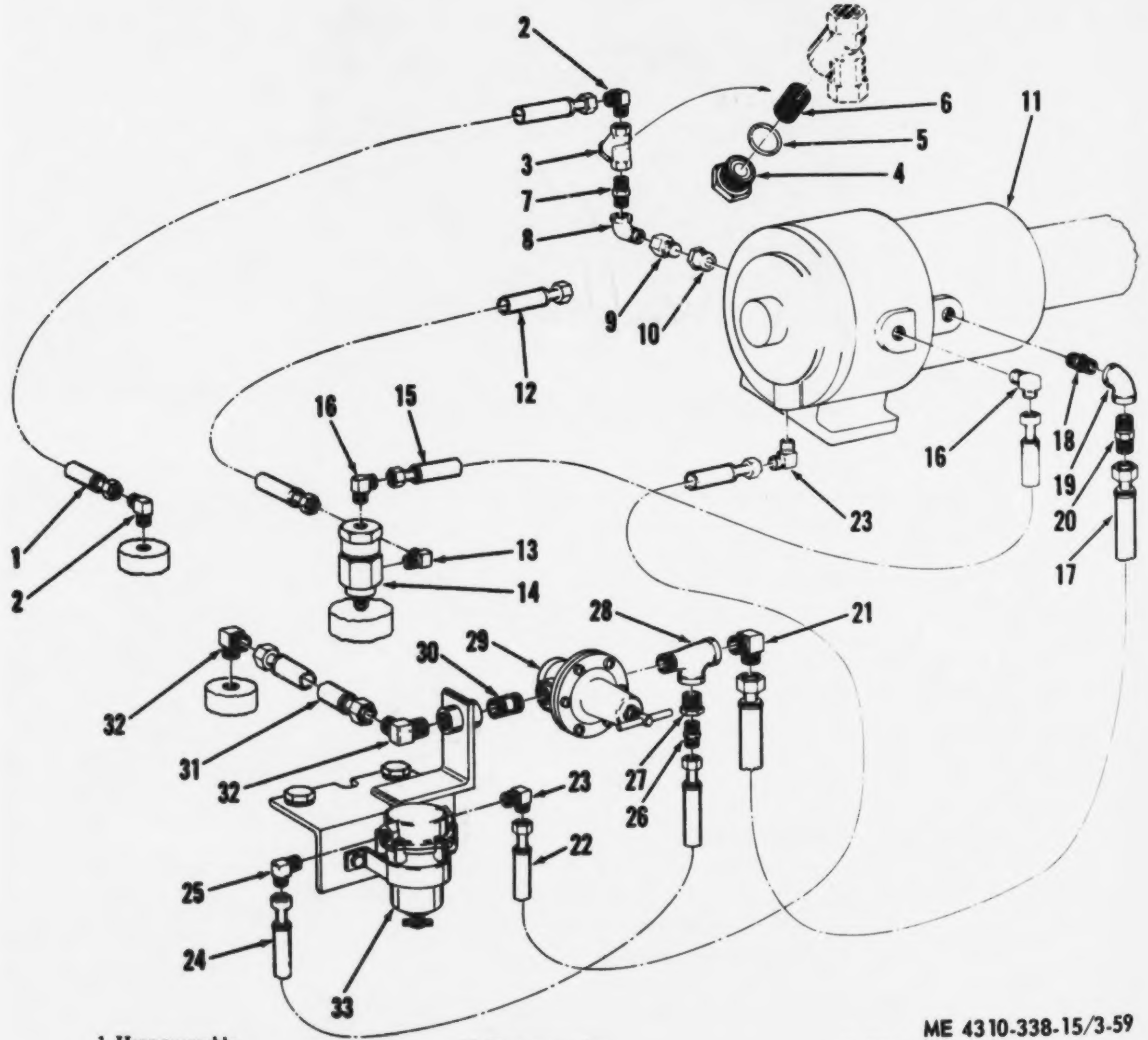
(2) Check valves for proper operation. Inspect parts for distortion, cracks, breaks, or any other defect.

(3) Inspect all threaded areas for cracks, distortion, raised metal, or any other defect.

c. Installation. Install air discharge connections, service valves, and piping as shown in figure 3-58.

3-81. Air Hoses, Strainer, and Fittings

a. Removal. Remove air hoses, strainer, and fittings by following numerical sequence shown in figure 3-59.



1. Hose assembly
2. Elbow (2)
3. Strainer
4. Plug
5. O-Ring
6. Element
7. Connector
8. Elbow
9. Orifice
10. Reducing bushing
11. Compressor intake-control
12. Hose assembly
13. Elbow
14. Blowdown valve assembly
15. Hose assembly
16. Elbow (2)
17. Hose assembly
18. Connector
19. Elbow
20. Connector
21. Elbow
22. Hose assembly
23. Elbow (2)
24. Hose assembly
25. Elbow
26. Connector
27. Reducing bushing
28. Tee
29. Air pressure regulator
30. Nipple
31. Hose assembly
32. Elbow (2)
33. Moisture separator

Figure 3-59. Air hoses, strainer, and fittings; removal and installation.

b. Disassembly. Disassemble strainer as shown in figure 3-59.

c. Cleaning and Inspection.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Clean hoses using a clean cloth soaked in solvent. Dry parts thoroughly.

(2) Inspect all hoses for cracks, breaks, deterioration, or any other defect.

(3) Inspect all fittings for damaged threads, cracks, distortion, or any other defect.

(4) Inspect strainer and element for cracks, breaks, distortion, or any other defect.

(5) Inspect attaching hardware for damaged threads, cracks, distortion, or any other defect.

d. Reassembly. Reassemble strainer as shown in figure 3-59.

e. Installation. Install air hoses, strainer, and fittings by following reverse numerical sequence shown in figure 3-59.

3-82. Minimum Pressure Valve Assembly

a. Disassembly.

CAUTION

Be sure all air is discharged from oil separator before attempting to replace minimum pressure valve.

(1) Disconnect air discharge piping from minimum pressure valve.

(2) Disassemble minimum pressure valve in numerical sequence shown in figure 3-60.

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard gaskets and O-rings.

(2) Insepct spring for defective coils, cracks, distortion, or any defect. Refer to table 5-2 for spring free length.

(3) Inspect non-return valve for condition of washer facing, cracks, distortion, or any other defect.

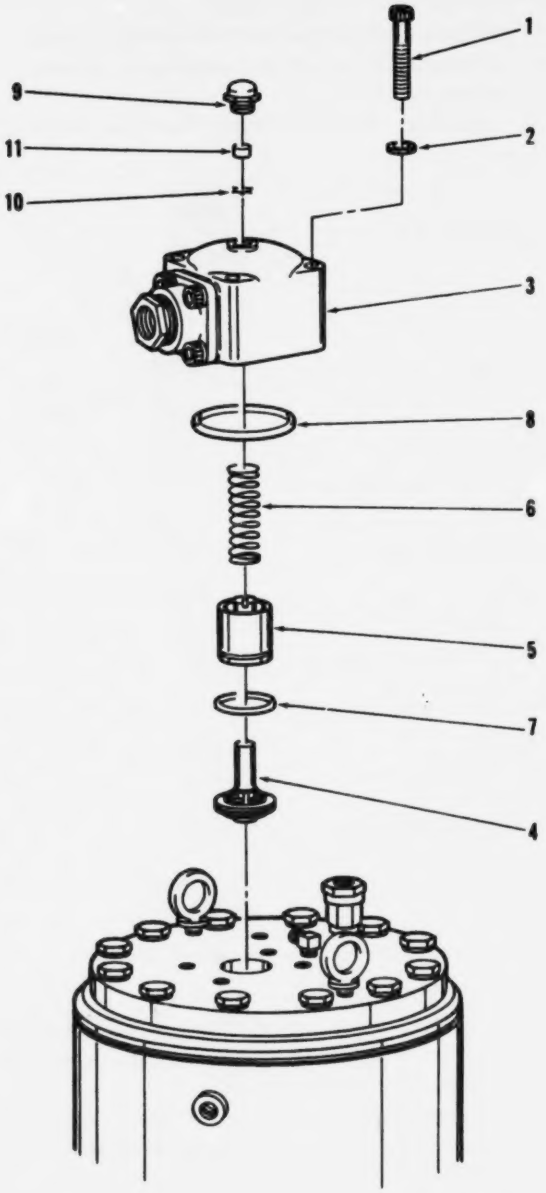
(4) Inspect all other parts for cracks, breaks, distortion, or any other defect.

(5) Inspect attaching hardware for damaged threads, cracks, breaks, distortion, or any other defect.

c. Reassembly.

(1) Reassemble minimum pressure valve in reverse numerical sequence shown in figure 3-60. Install new gaskets and O-rings.

(2) Connect air discharge piping to minimum pressure valve.



ME 4310-338-15/3-60

1. Screw (4)
2. Washer (4)
3. Housing
4. Valve assembly
5. Piston
6. Spring
7. O-Ring
8. O-Ring
9. Breather
10. Retaining ring
11. Felt

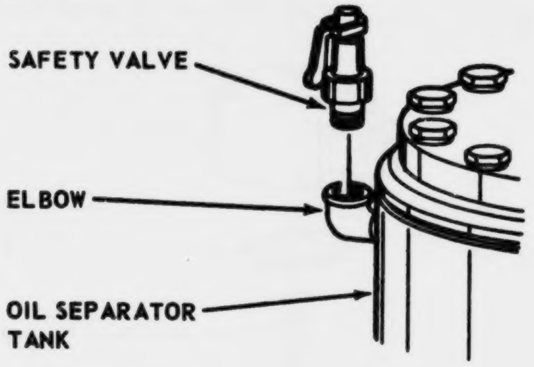
Figure 3-60. Minimum pressure valve; disassembly and reassembly.

3-83. Safety Valve

CAUTION

Be sure all air pressure is discharged from oil separator before attempting to replace safety valve.

a. Removal. Remove safety valve as shown in figure 3-61.



ME 4310-338-15/3-61

REMOVAL

UNSCREW AND REMOVE SAFETY VALVE FROM ELBOW.

INSTALLATION

SCREW SAFETY VALVE INTO ELBOW AND TIGHTEN.

Figure 3-61. Safety valve; removal and installation.

b. Cleaning and Inspection.

(1) Clean safety valve using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Check lever operation. Inspect valve for cracks, breaks, distortion, damaged threads, or any other defect.

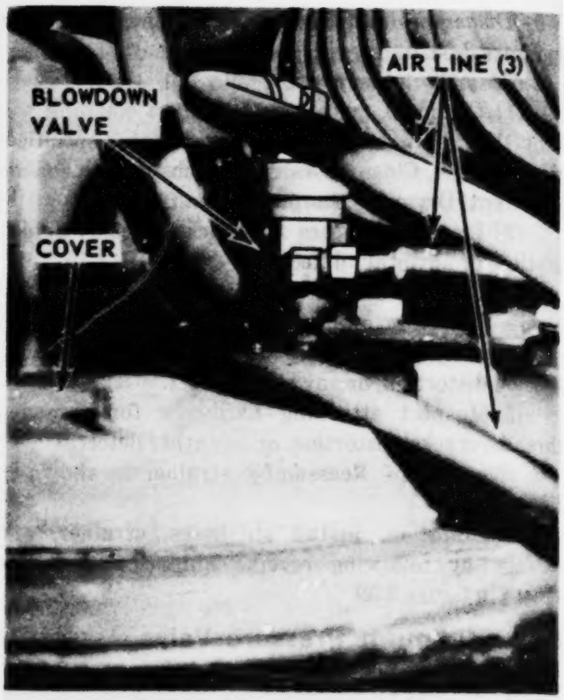
c. Installation. Install safety valve as shown in figure 3-61.

3-84. Blowdown Valve Assembly

CAUTION

Be sure all air pressure is discharged from oil separator before attempting to replace blowdown valve assembly.

a. Removal. Remove blowdown valve assembly as shown in figure 3-62.



ME 4310-338-15/3-62

REMOVAL

STEP 1. DISCONNECT AIR LINES FROM BLOWDOWN VALVE.

STEP 2. UNSCREW AND REMOVE BLOWDOWN VALVE FROM OIL SEPARATOR COVER.

INSTALLATION

STEP 1. INSTALL BLOWDOWN VALVE ON OIL SEPARATOR COVER.

STEP 2. CONNECT AIR LINES TO BLOWDOWN VALVE.

Figure 3-62. Blowdown valve assembly; removal and installation.

b. Disassembly. Disassemble blowdown valve assembly in numerical sequence shown in figure 3-63.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard O-ring.

(2) Inspect spring for defective coils, cracks, distortion, or any other defect. Refer to Table 5-2 for spring free length.

(3) Inspect ball for scoring, roughness, cracks, or any other defect.

(4) Inspect fittings, bushing, and all other parts for damaged threads, cracks, distortion, or any other defect.

d. Reassembly. Reassemble blowdown valve assembly in reverse numerical sequence shown in figure 3-63. Install a new O-ring.

e. Installation. Install blowdown valve assembly as shown in figure 3-62.

3-85. Thermal Bypass Valve Assembly

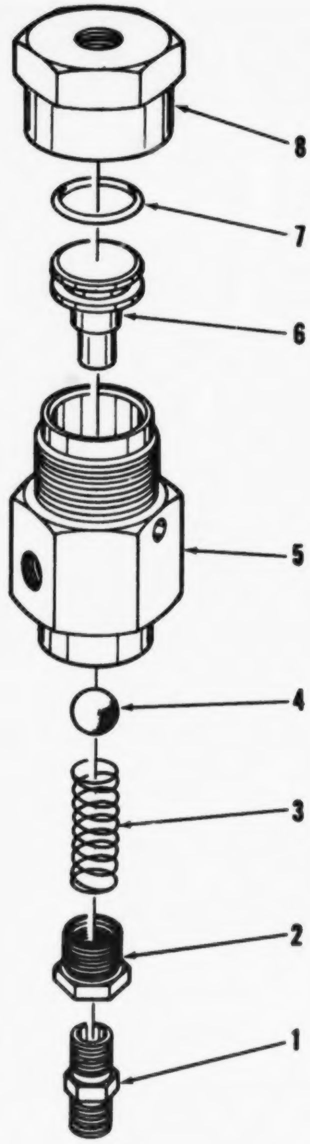
a. Removal.

CAUTION

If drained oil is to be reused, take necessary precautions to prevent contamination.

(1) Drain all oil from oil separator assembly.

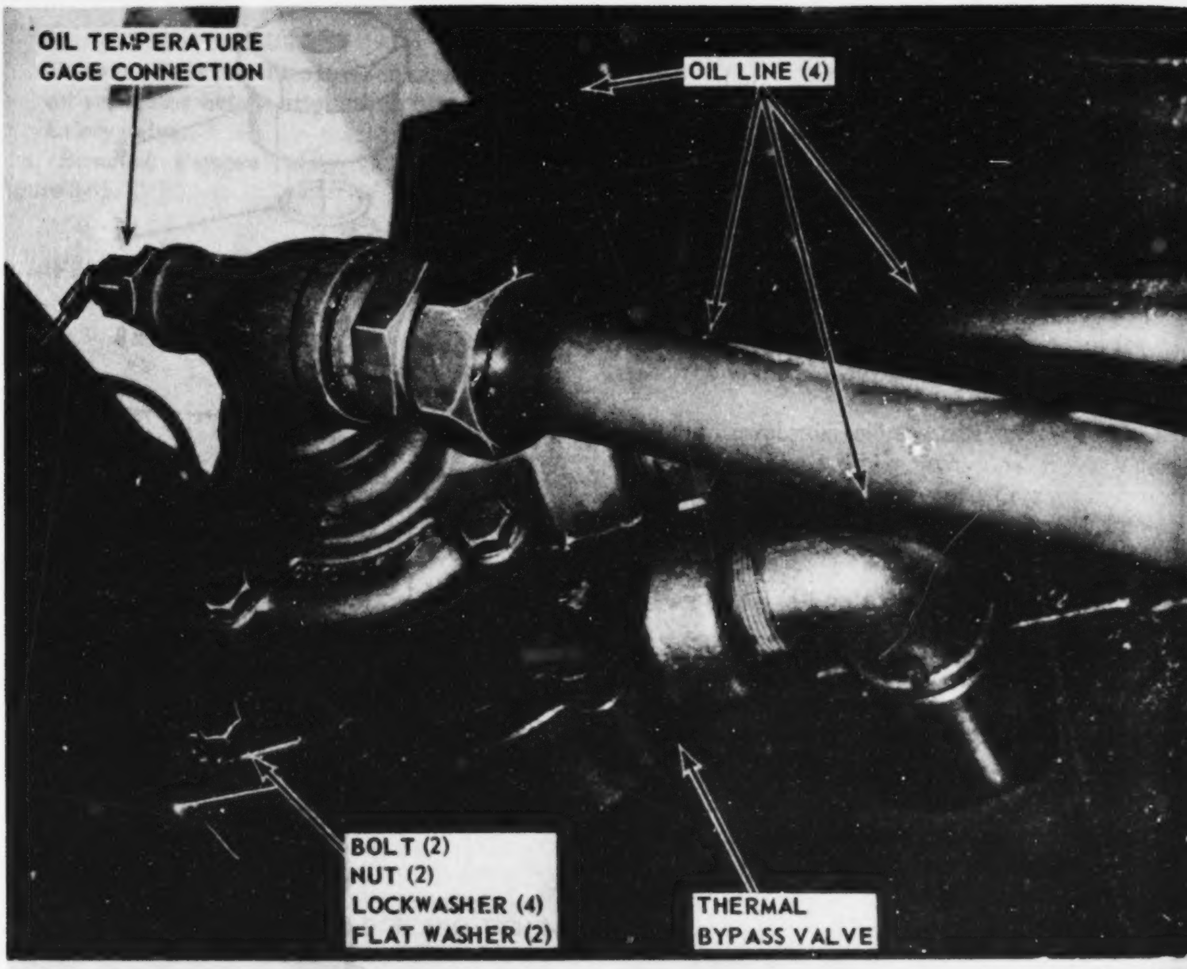
(2) Remove thermal bypass valve assembly as shown in figure 3-64.



1. Connector
2. Bushing
3. Spring
4. Ball
5, Cap
6. Piston
7, O-Ring
8. Body

ME 4310-338-15/3-63

Figure 3-63. Blowdown valve assembly; disassembly and reassembly.


OIL TEMPERATURE GAGE CONNECTION
OIL LINE (4)
BOLT (2)
NUT (2)
LOCKWASHER (4)
FLAT WASHER (2)
THERMAL BYPASS VALVE

ME 4310-338-15/3-64

REMOVAL

STEP 1. DISCONNECT OIL LINES.

STEP 2. DISCONNECT OIL TEMPERATURE GAGE CONNECTION.

STEP 3. REMOVE BOLTS, NUTS, AND WASHERS. REMOVE THERMAL BYPASS VALVE ASSEMBLY.

INSTALLATION

STEP 1. POSITION THERMAL BYPASS VALVE AS- SEMBLY. INSTALL BOLTS, NUTS, AND WASHERS.

STEP 2. CONNECT OIL LINES.

STEP 3. CONNECT OIL TEMPERATURE GAGE CONNECTION.

Figure 3-64. Thermal bypass valve assembly; removal and installation.

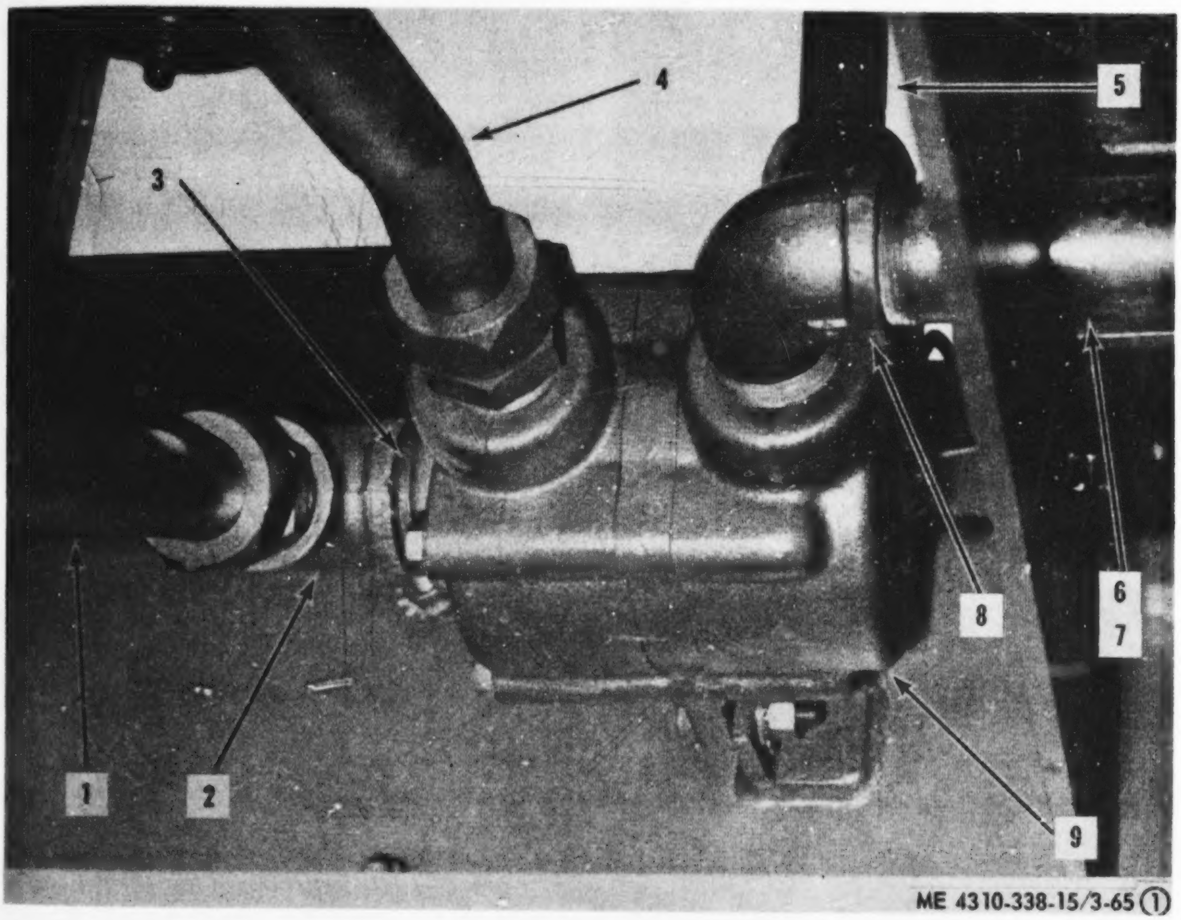
b. Installation.

(1) Install thermal bypass valve assembly as shown in figure 3-64.

(2) Replenish oil supply in oil separator assembly (refer to LO 5-4310-338-12). If drained oil is being reused, check carefully for any obvious contamination; then strain oil as it is being added, using clean, lint-free cloth.

3-86. Compressor Oil Lines and Fittings

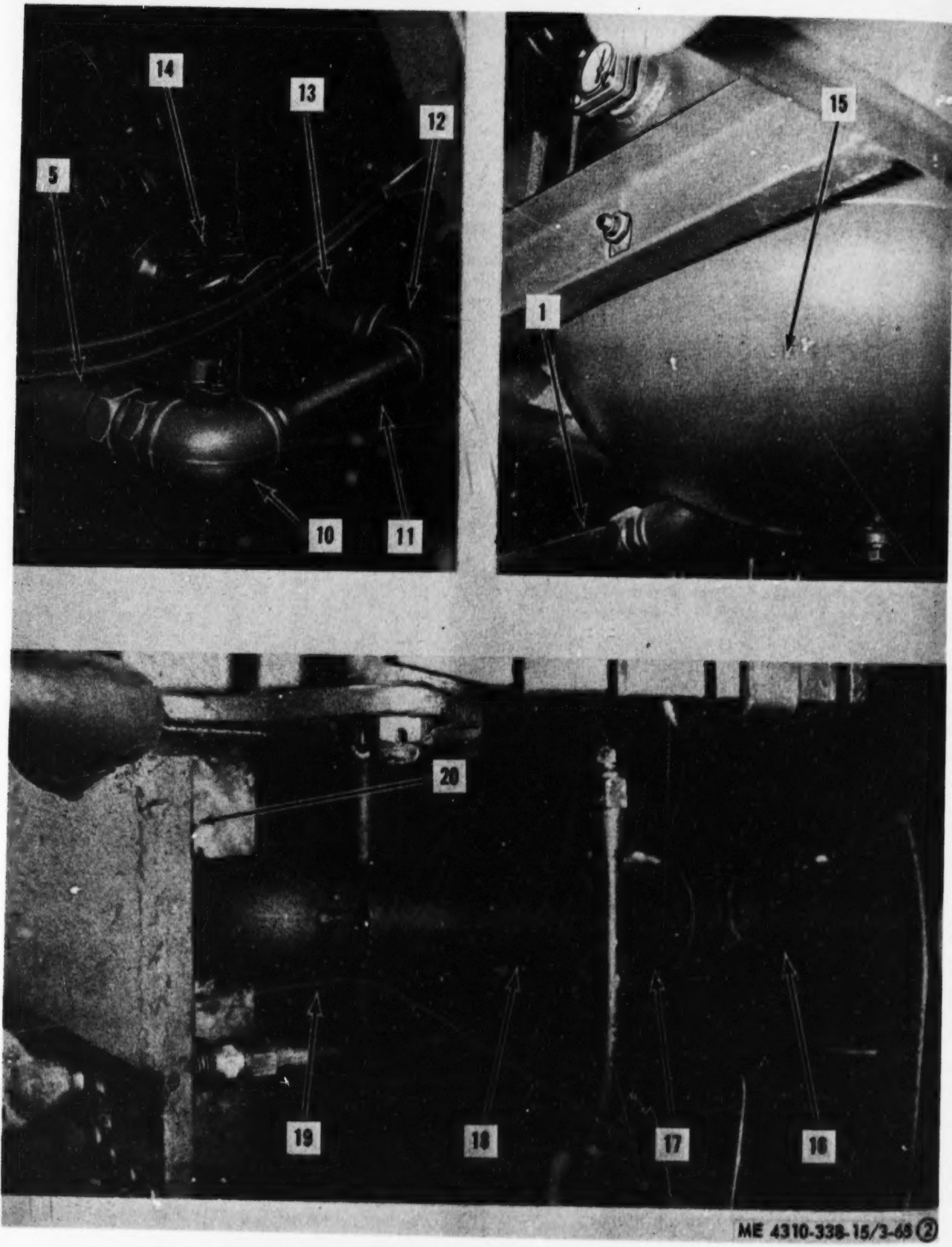
a. Removal. Remove compressor oil lines and fittings as shown in figure 3-65.



ME 4310-338-15/3-65 ①

1. Tube assembly
2. Tee
3. Nipple
4. Tube assembly
5. Tube assembly
6. Nipple
7. Coupling
8. Elbow
9. hermal bypass valve (ref)
10. Elbow
11. Nipple
12. Elbow
13. Nipple
14. Compressor oil filter (ref)
15. Oil separator tank (ref)
16. Tube assembly
17. Coupling (2)
18. Nipple (2)
19. Elbow (2)
20. Oil cooler (ref)
21. Plug
22. Elbow
23. Nipple
24. Elbow

Figure 3-65. Compressor oil lines and fittings, removal and installation (sheet 1 of 3).


14
13
12
5
10
11
15
1
20
19
18
17
16

ME 4310-338-15/3-65 ②

Figure 3-65. Compressor oil lines and fittings, removal and installation (sheet 2 of 3).

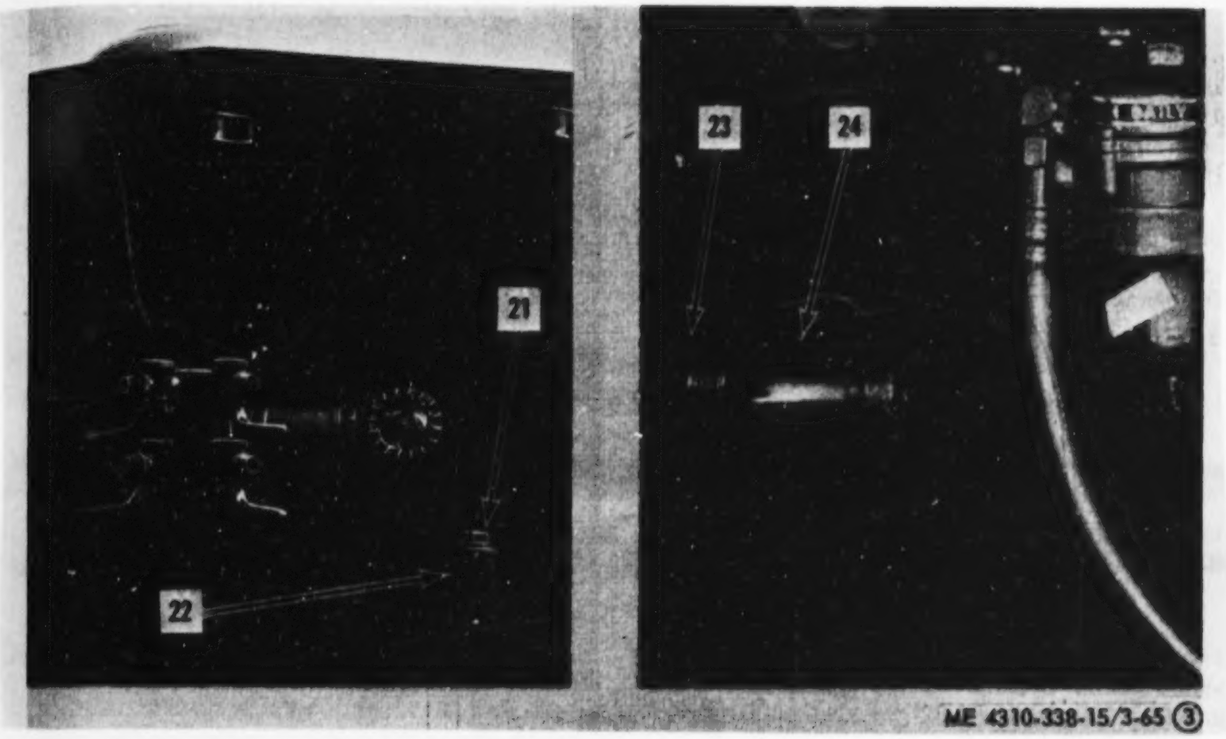

21
22
23
24
DAILY
ME 4310-338-15/3-65 ③

Figure 3-65. Compressor oil lines and fittings, removal and installation (sheet 3 of 3)

b. Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect oil tubes for cracks, breaks, distortion, or any other defect.

(3) Inspect fittings for cracks, damaged threads, distortion, or any other defect.

c. Installation. Install compressor oil lines and fittings as shown in figure 3-65.

3-87. Compressor Oil Filter Assembly

a. Removal.

(1) Drain all oil from filter assembly.

(2) Remove oil filter assembly as shown in figure 3-66.

b. Disassembly. Disassemble compressor oil filter assembly in numerical sequence shown in figure 3-67.

c. Cleaning and Inspection.

(1) Clean all metal parts and element using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard gasket.

(2) Inspect element for cracks, breaks, distortion, tears, or any other defect.

(3) Inspect all other parts for cracks, excessive wear, distortion, or any other defect.

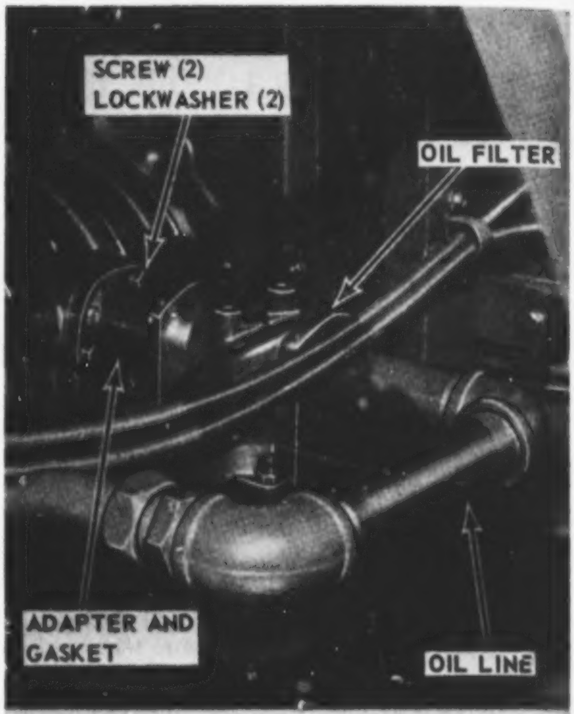
(4) Inspect attaching hardware for damaged threads, cracks, breaks, or any other defect.

d. Reassembly. Reassemble compressor oil filter assembly in reverse numerical sequence shown in figure 3-67. Install new O-ring and gasket.

e. Installation. Install compressor oil filter assembly as shown in figure 3-66.

3-88. Speed Control Linkage

a. Removal and Disassembly. Remove and disassemble speed control linkage as shown in figure 3-68.



ME 4310-338-15/3-66

REMOVAL

STEP 1. DISCONNECT OIL LINE FROM OIL FILTER.

STEP 2. REMOVE SCREWS AND LOCKWASHERS. REMOVE OIL FILTER, ADAPTER, AND GASKET.

STEP 3. REMOVE ADAPTER FROM OIL FILTER.

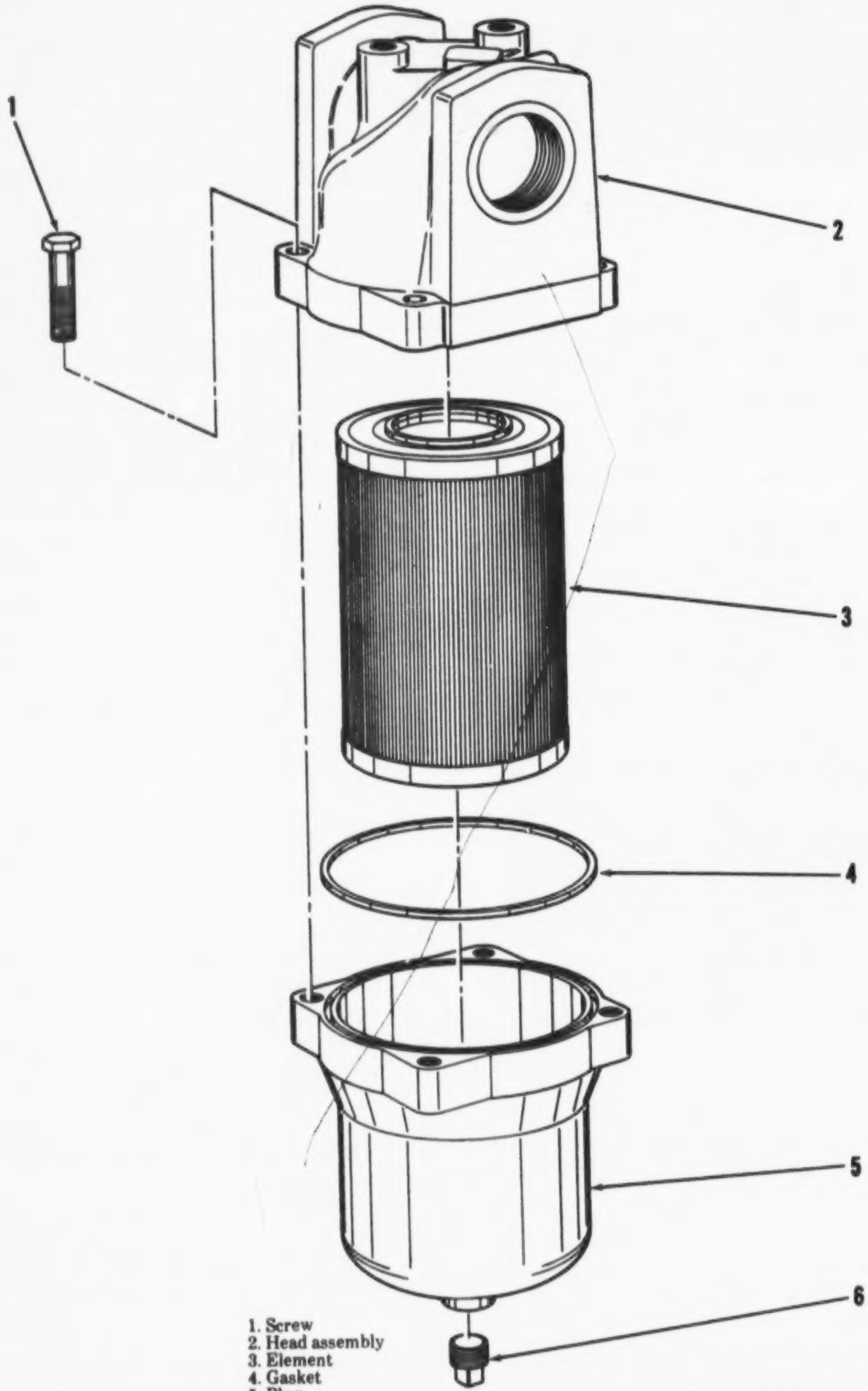
INSTALLATION

STEP 1. INSTALL ADAPTER TO OIL FILTER.

STEP 2. INSTALL GASKET. POSITION OIL FILTER AND ADAPTER AND SECURE WITH SCREWS AND LOCKWASHERS.

STEP 3. CONNECT OIL LINE TO OIL FILTER.

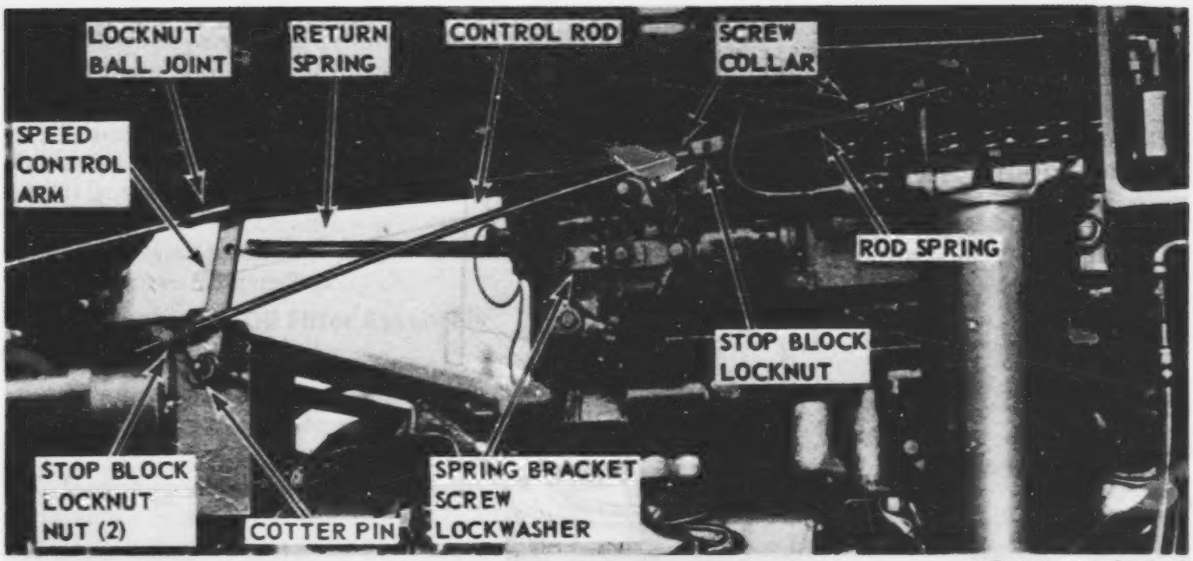
Figure 3-66. Compressor oil filter assembly; removal and installation.



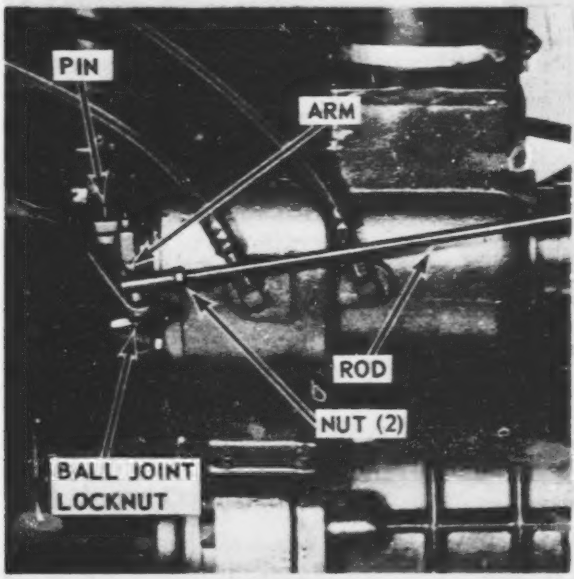
1. Screw
2. Head assembly
3. Element
4. Gasket
5. Plug
6. Housing

ME 4310-338-15/3-67

Figure 3-67. Compressor oil filter assembly; disassembly and reassembly.


LOCKNUT
BALL JOINT
RETURN
SPRING
CONTROL ROD
SCREW
COLLAR
SPEED
CONTROL
ARM
ROD SPRING
STOP BLOCK
LOCKNUT
STOP BLOCK
LOCKNUT
NUT (2)
COTTER PIN
SPRING BRACKET
SCREW
LOCKWASHER

ME 4310-338-15/3-68


PIN
ARM
ROD
NUT (2)
BALL JOINT
LOCKNUT

REMOVAL

STEP 1. REMOVE LOCKNUTS AND DISCONNECT STOP BLOCKS FROM GOVERNOR CONTROL ARM AND SPEED CONTROL ARM.

STEP 2. LOOSEN SCREWS AND REMOVE COLLARS, SPRING, AND STOP BLOCK FROM FRONT CONTROL ROD.

STEP 3. REMOVE NUTS AND STOP BLOCK FROM FRONT CONTROL ROD.

STEP 4. REMOVE RETURN SPRING, SPRING BRACKET, SCREW, AND LOCKWASHER.

STEP 5. REMOVE LOCKNUTS AND DISCONNECT BALL JOINTS FROM ARMS. REMOVE NUTS AND BALL JOINTS FROM ROD.

STEP 6. REMOVE PIN, COTTER PIN, AND BOTH ARMS.

INSTALLATION

STEP 1. INSTALL BOTH SPEED CONTROL ARMS AND SECURE WITH PIN AND COTTER PIN.

STEP 2. INSTALL BALL JOINTS AND NUTS ON REAR CONTROL ROD. CONNECT BALL JOINTS TO ARMS AND SECURE WITH LOCKNUTS.

STEP 3. INSTALL STOP BLOCK AND NUTS ON REAR END OF FRONT CONTROL ROD.

STEP 4. INSTALL STOP BLOCK, COLLARS, SCREWS, AND SPRING ON FRONT CONTROL ROD.

STEP 5. INSTALL STOP BLOCKS ON GOVERNOR CONTROL ARM AND SPEED CONTROL ARM. INSTALL LOCKNUTS TO SECURE STOP BLOCKS.

STEP 6. INSTALL RETURN SPRING, SPRING BRACKET, SCREW, AND LOCKWASHER.

Figure 3-68. Speed control linkage: removal, disassembly, reassembly, and installation

b. Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect ball joints for freedom of movement. Inspect for distortion or any other defect.

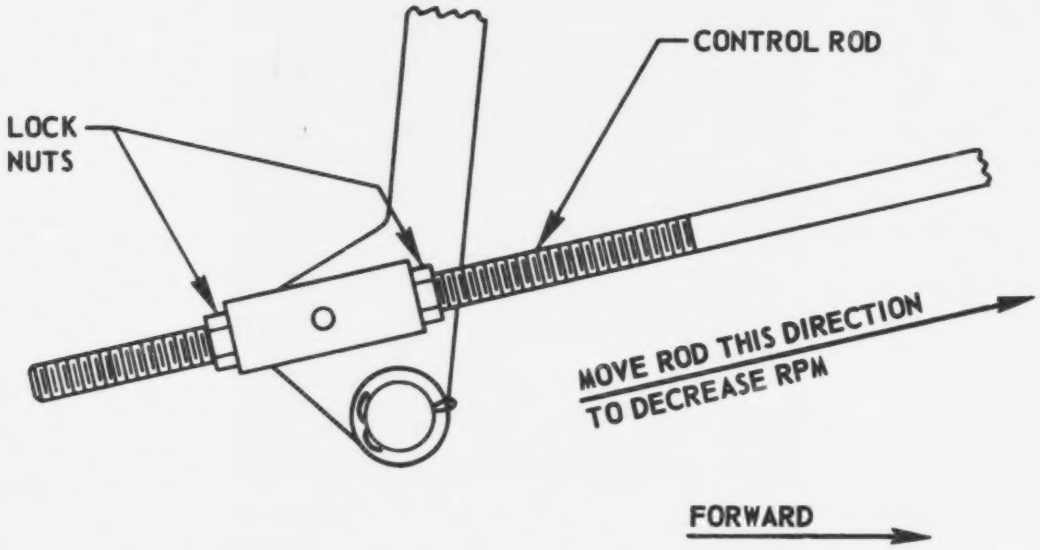
(3) Inspect rods for damaged threads, cracks, distortion, or any other defects.

(4) Inspect springs for distortion, cracks, breaks, or any other defect.

(5) Inspect all other parts for damaged threads, cracks, breaks, distortion, or any other defect.

c. Reassembly and Installation. Reassemble and install speed control linkage as shown in figure 3-68.

d. Adjustment. Adjust speed control linkage as shown in figure 3-69.



ME 4310-338-15/3-69

STEP 1. START ENGINE (PARA 2-9) AND ALLOW EQUIPMENT TO REACH OPERATING TEMPERATURES. PLACE RUN-START LEVER IN RUN POSITION.

STEP 2. KEEP ENGINE AT LOW IDLE (AIR DISCHARGE VALVES CLOSED). LOOSEN LOCK NUTS AND MOVE CONTROL ROD AS REQUIRED TO SET ENGINE SPEED AT 1000 RPM. TIGHTEN NUTS.

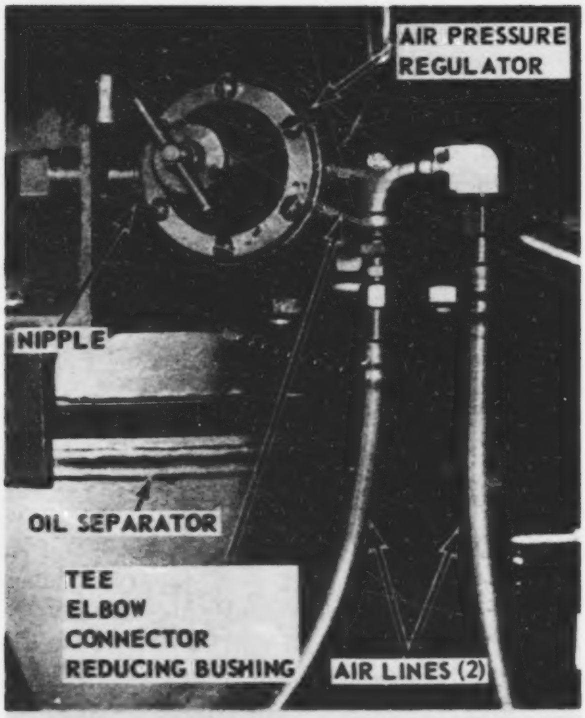
STEP 3. RECYCLE AIR COMPRESSOR UNIT SEVERAL TIMES BY OPENING AND CLOSING AIR DISCHARGE VALVE. OBSERVE TACHOMETER EACH TIME TO ENSURE ENGINE LOW IDLE REMAINS AT 1000 RPM.

STEP 4. STOP ENGINE (FIG. 2-9).

Figure 3-69. Speed control linkage adjustment.

3-89. Air Pressure Regulator Assembly

a. Removal. Remove air pressure regulator assembly as shown in figure 3-70.


AIR PRESSURE REGULATOR
NIPPLE
OIL SEPARATOR
TEE
ELBOW
CONNECTOR
REDUCING BUSHING
AIR LINES (2)

ME 4310-338-15/3-70

REMOVAL

STEP 1. REMOVE AIR LINES. REMOVE TEE, ELBOW, CONNECTOR, AND REDUCING BUSHING.

STEP 2. UNSCREW AND REMOVE AIR PRESSURE REGULATOR FROM NIPPLE.

INSTALLATION

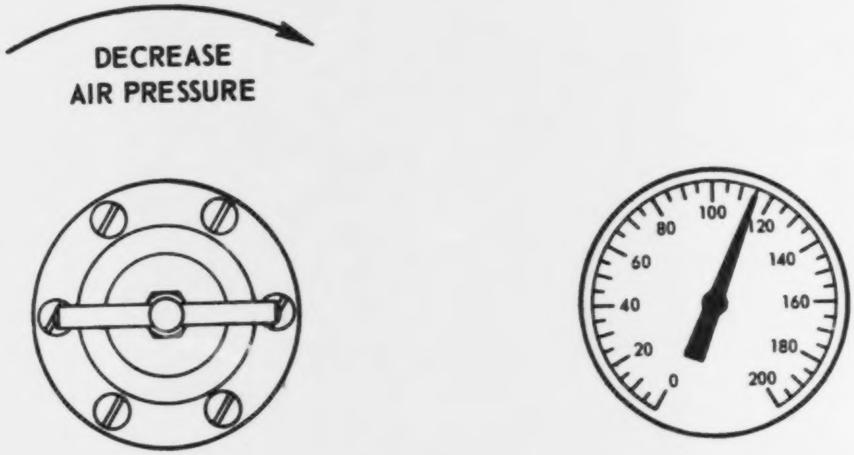
STEP 1. INSTALL AIR PRESSURE REGULATOR ON NIPPLE AND TIGHTEN.

STEP 2. INSTALL TEE, ELBOW, CONNECTOR, AND REDUCING BUSHING. INSTALL AIR LINES.

Figure 3-70. Air pressure regulator assembly; removal and installation.

b. Installation. Install air pressure regulator assembly as shown in figure 3-70.

c. Adjustment. Adjust air pressure regulator assembly as shown in figure 3-71.



A AIR PRESSURE REGULATOR

B AIR PRESSURE GAGE

ME 4310-338-15/3-71

STEP 1. START ENGINE (PARA 2-9) AND ALLOW EQUIPMENT TO REACH OPERATING TEMPERATURES. PLACE RUN-START LEVER IN RUN POSITION.

STEP 2. CLOSE ALL AIR DISCHARGE VALVES. ADJUST AIR PRESSURE REGULATOR TO OBTAIN A READING OF 115-117 PSI ON AIR PRESSURE GAGE WHEN ENGINE IS AT LOW IDLE (1000 RPM). IF AIR PRESSURE RISES ABOVE 117 PSI, TURN HANDLE ON AIR PRESSURE REGULATOR IN DIRECTION TO DECREASE AIR PRESSURE AND BLEED OFF EXCESS AIR BY OPENING AIR DISCHARGE VALVE. AFTER EXCESS AIR HAS BEEN DISCHARGED, CLOSE VALVE AND READJUST AIR PRESSURE REGULATOR TO OBTAIN 115-117 PSI.

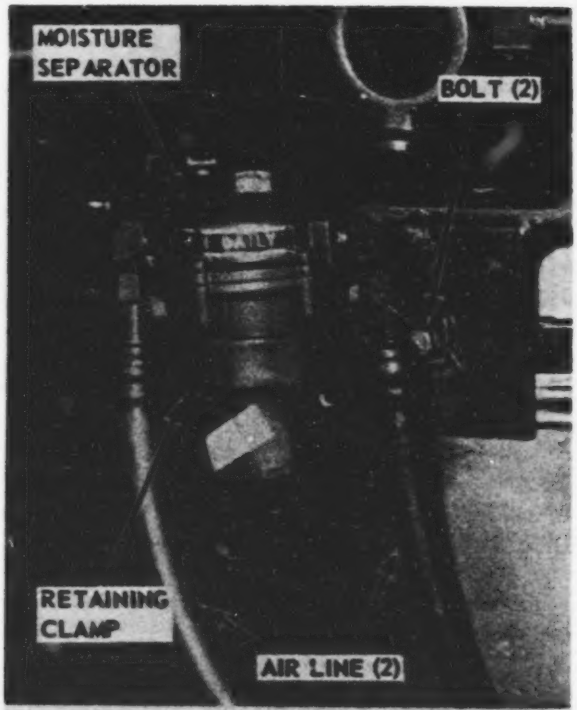
STEP 3. RECYCLE AIR COMPRESSOR UNIT SEVERAL TIMES BY OPENING AND CLOSING AIR DISCHARGE VALVE. OBSERVE AIR PRESSURE GAGE EACH TIME TO ENSURE PRESSURE SETTING REMAINS STABLE.

STEP 4. STOP ENGINE (FIG. 2-9).

Figure 3-71. Air pressure regulator adjustment.

3-90. Moisture Separator Assembly

a. Removal. Remove moisture separator assembly as shown in figure 3-72.


MOISTURE SEPARATOR
BOLT (2)
DAILY
RETAINING CLAMP
AIR LINE (2)

ME 4310-338-15/3-72

REMOVAL

STEP 1. DISCONNECT AIR LINES.

STEP 2. LOOSEN RETAINING CLAMP BY LOOSENING BOLTS. REMOVE MOISTURE SEPARATOR FROM CLAMP.

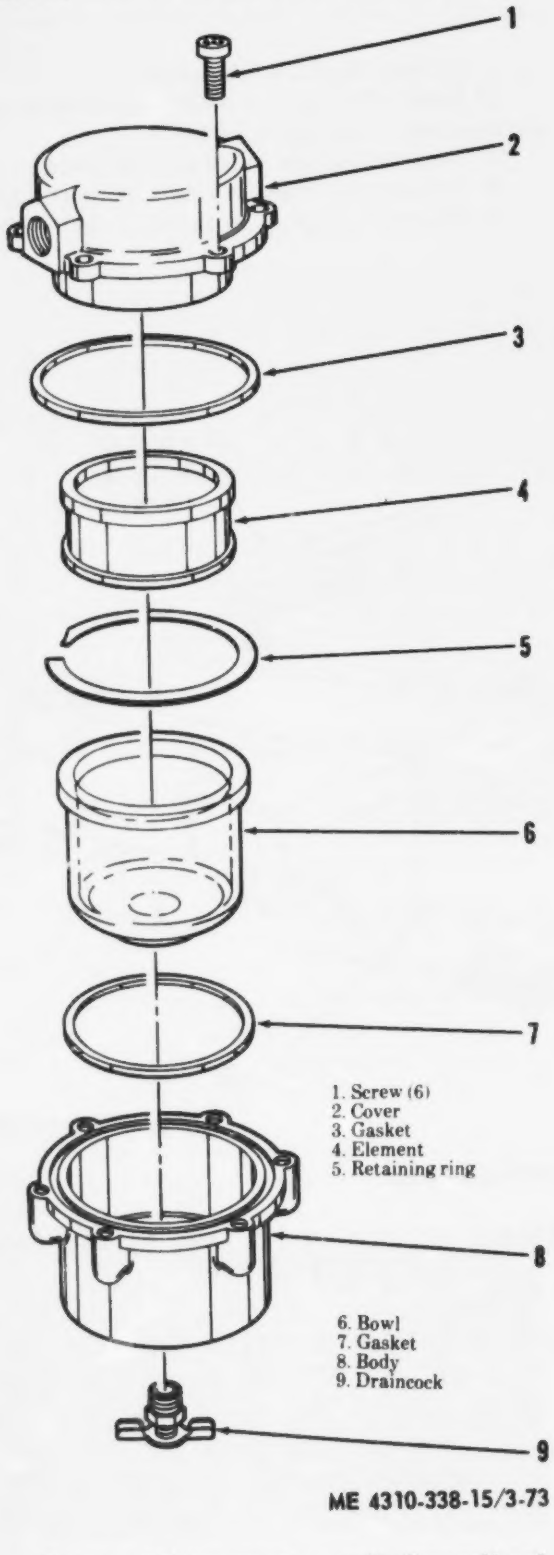
INSTALLATION

STEP 1. PLACE MOISTURE SEPARATOR IN RETAINING CLAMP. TIGHTEN BOLTS.

STEP 2. CONNECT AIR LINES.

Figure 3-72. Moisture separator assembly; removal and installation.

b. Disassembly. Disassemble moisture separator assembly in numerical sequence shown in figure 3-73.



1. Screw (6)
2. Cover
3. Gasket
4. Element
5. Retaining ring
6. Bowl
7. Gasket
8. Body
9. Draincock

ME 4310-338-15/3-73

Figure 3-73. Moisture separator assembly; disassembly and reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard gasket.

CAUTION

If other than household type detergent is used in following step, be sure the cleaner is safe, since many types of cleaning agents are injurious to the polycarbonate bowl.

(2) Clean bowl using a household type detergent; rinse, and dry thoroughly.

(3) Clean filter with spirits or kerosene and dry with compressed air.

(4) Inspect bowl for cracks, chips, or any other defect.

(5) Inspect draincock for improper operation, damaged threads, or any other defect.

(6) Inspect all other parts for cracks, breaks, deterioration, or any other defect.

(7) Inspect attaching hardware for damaged threads, cracks, distortion, or any other defect.

d. Reassembly. Reassemble moisture separator assembly in reverse numerical sequence shown in figure 3-73. Install a new gasket.

e. Installation. Install moisture separator assembly as shown in figure 3-72, making sure arrow on top of unit is pointing in direction of air flow.

CAUTION

Pull stop cable out to STOP position to close the fuel injector rack before engine is rotated by pressing start button. If rack is not closed when start button is pressed, engine may start.

3-91. Not Applicable.

3-92. Fuel Tanks

a. Removal.

CAUTION

> **Use extreme caution when handling fuel. Do not allow flame or smoking around fuel. Keep fuel free of water or dirt.**

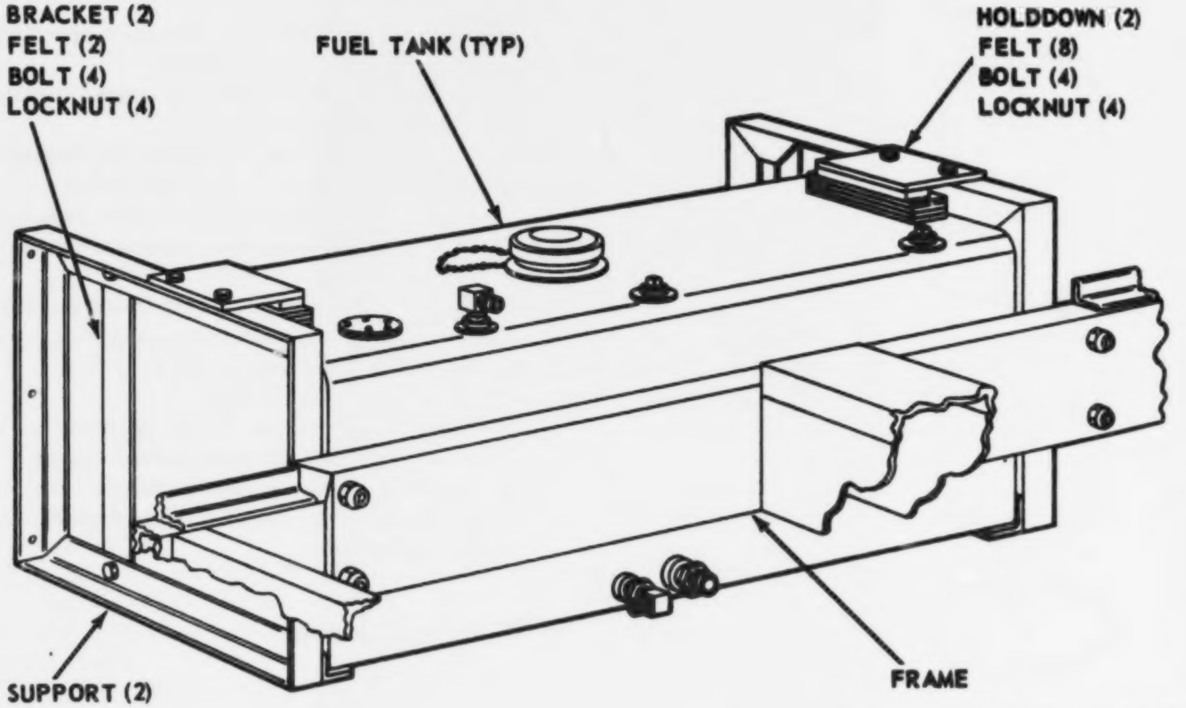
(1) Drain all fuel from fuel tanks.

(2) Remove housing components as necessary to provide access to fuel tanks (para 3-33).

(3) Disconnect all fuel lines from fuel tanks.

(4) Remove fuel gage sending unit (para 3-51).

(5) Remove fuel tanks as shown in figure 3-74.



ME 4310-338-15/3-74

REMOVAL

STEP 1. REMOVE BOLTS AND LOCKNUTS FROM HOLDDOWNS. REMOVE HOLDDOWNS AND FELT.

STEP 2. REMOVE BOLTS AND LOCKNUTS FROM BRACKET. REMOVE BRACKET AND FELT.

STEP 3. LIFT FUEL TANK OFF SUPPORTS.

INSTALLATION

STEP 1. POSITION FUEL TANK IN MOUNTING POSITION ON SUPPORTS.

STEP 2. INSTALL BRACKETS AND FELT AND SECURE WITH BOLTS AND LOCKNUTS.

STEP 3. INSTALL HOLDDOWNS AND FELT AND SECURE WITH BOLTS AND LOCKNUTS.

Figure 3-74. Fuel tanks; removal and installation.

b. Cleaning and Inspection.

(1) Clean fuel tanks using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(2) Inspect fuel tanks for cracks, holes, corrosion, or any other defect.

(3) Inspect attaching hardware for damaged threads, distortion, cracks, or any other defect.

c. Installation.

(1) Install fuel tanks as shown in figure 3-74.

(2) Install fuel gage sending unit (para 3-51).

(3) Connect all fuel lines to fuel tanks.

(4) Install housing components (para 3-33).

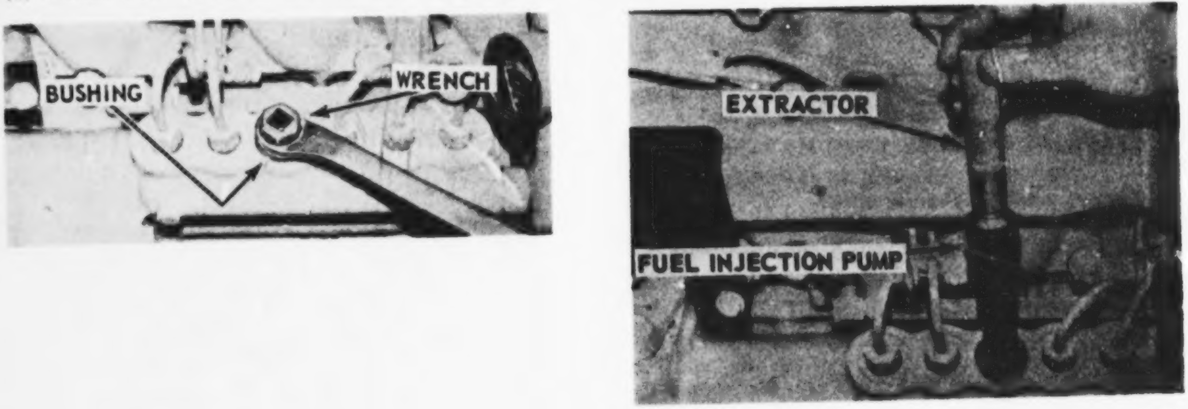
(5) Replenish fuel supply. Check for leaks.

3-93. Fuel Injection Pumps

a. Removal.

(1) Remove fuel line from fuel injection pump.

(2) Remove fuel injection pump as shown in figure 3-75.



ME 4310-338-15/3-75

STEP 1. LOOSEN AND REMOVE BUSHING.

STEP 2. ATTACH AN EXTRACTOR TOOL TO FUEL INJECTION PUMP. REMOVE PUMP.

Figure 3-75. Fuel injection pump; removal and installation

b. Installation.

CAUTION

The fuel rack must be held at the center or zero position when installing a fuel injection pump. An injection pump installed in the fuel on side of its gear segment can cause the engine to overspeed with resultant serious damage to the engine.

(1) Disconnect speed control rod from governor control lever.

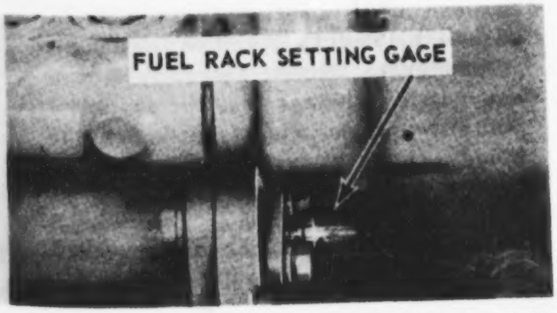
(2) Remove cover and install a fuel rack setting gage on fuel injection pump housing, as shown in figure 3-76.

(3) Using governor control lever, position fuel rack until gage indicates .000" when resting against end of fuel rack.

NOTE

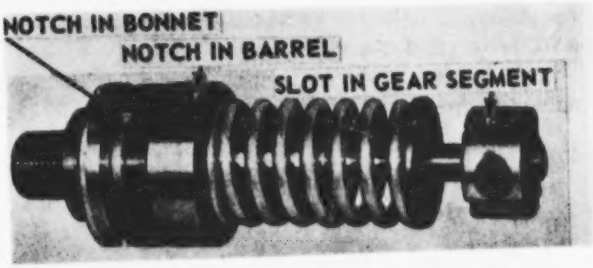
This step is essential because it aligns center notch on fuel rack so that it will recive center tooth of gear segment on injection pump plunger. It may be necessary to move the speed limiter plunger (fig. 6-17) in order to obtain unrestricted movement of the fuel rack.

(4) On fuel injection pump, align notches as shown in figure 3-77.



ME 4310-338-15/3-76

Figure 3-76. Fuel rack setting gage installation.



ME 4310-338-15/3-77

ALIGNING THE INJECTION PUMP

Figure 3-77. Alignment of notches on fuel injection pump.

(5) Using an extractor tool, insert fuel injection pump into bore in housing. Notches in bonnet and barrel must engage with two locating dowels in bore. These dowels align pump barrel fuel inlet port with fuel manifold outlet port.

(6) Place a new O-ring over bonnet and install retainer bushing. Finger-tighten bushing until it is flush with top of injection pump housing. If bushing cannot be finger turned flush with top of housing, notch in bonnet is not aligned with dowel in housing. Remove pump and repeat steps 3 through 6 until pump seats properly.

CAUTION

Fuel injection pump will leak if bushing is tightened to less than 140 foot-pounds. If bushing is tightened to more than 160 foot-pounds, the housing can be damaged.

(7) Tighten retainer bushing to a torque value of 140 to 160 foot-pounds.

(8) Install felt washer and fuel line. Tighten fuel line nut to a torque value of 25 to 35 foot-pounds.

(9) Remove fuel rack setting gage and install cover on housing.

(10) Connect speed control rod to governor control lever. Adjust speed control linkage (para 3-88).

3-94. Fuel Injection Valves

a. Removal. Remove fuel injection valve as shown in figure 3-78.

b. Disassembly. Disassemble fuel injection valve as shown in figure 3-79. Discard O-ring.

c. Cleaning and Inspection.

CAUTION

To prevent damage to the nozzle, do not remove carbon deposits from the orifice using a wire brush or wheel.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Inspect nozzle for carbon buildup and clean as necessary. If cleaning cannot be accomplished satisfactorily, replace nozzle.

(2) Inspect parts for cracks, breaks, distortion, damaged threads, or any other defect.

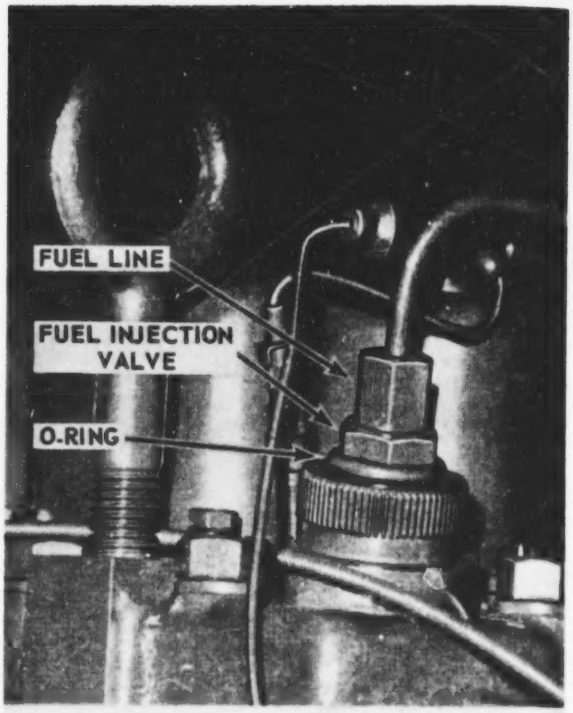
CAUTION

In following step, tighten nozzle finger tight only.

d. Reassembly. Reassemble fuel injection valve as shown in figure 3-79. Install a new O-ring.

e. Installation.

(1) Check tightness of precombustion chamber. Chamber should be seated to a torque value of 150 foot-pounds.



ME 4310-338-15/3-78

REMOVAL

STEP 1. REMOVE FUEL LINE.

STEP 2. UNSCREW AND REMOVE VALVE ASSEMBLY. REMOVE O-RING.

INSTALLATION

STEP 1. INSTALL NEW O-RING. INSTALL AND TIGHTEN VALVE ASSEMBLY.

STEP 2. INSTALL AND TIGHTEN FUEL LINE.

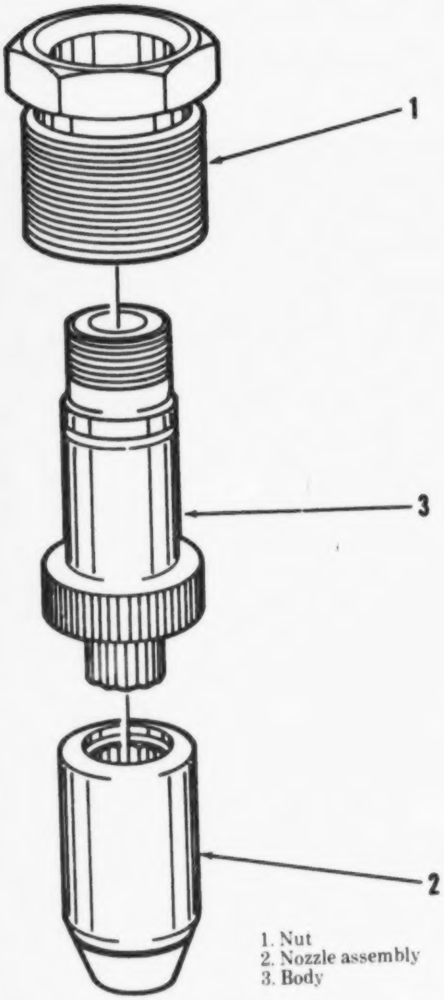
Figure 3-78. Fuel injection valve; removal and installation.

CAUTION

It is extremely important that nut torque be maintained at the specified valve in the following step. Excessive torque will damage nozzle, whereas insufficient torque will allow nozzle to leak, causing case to bulge or split.

(2) Install fuel injection valve as shown in figure 3-78. Tighten nut to a torque value of 100 to 110 foot-pounds.

(3) Install fuel line and tighten nut to a torque value of 25 to 35 foot-pounds.



1. Nut
2. Nozzle assembly
3. Body

ME 4310-338-15/3-79

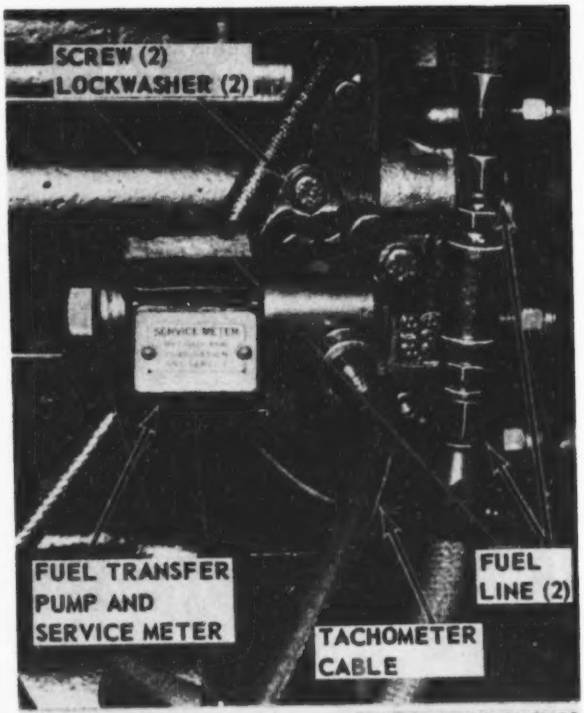
Figure 3-79. Fuel injection valve; disassembly and reassembly.

3-95. Fuel Transfer Pump

a. Removal.

(1) Remove service meter (para 3-56).

(2) Remove fuel transfer pump assembly as shown in figure 3-80.


SCREW (2)
LOCKWASHER (2)
FUEL TRANSFER PUMP AND SERVICE METER
FUEL LINE (2)
TACHOMETER CABLE
SERVICE METER

ME 4310-338-15/3-80

REMOVAL

STEP 1. REMOVE FUEL LINES.

STEP 2. DISCONNECT TACHOMETER CABLE.

STEP 3. REMOVE SCREWS AND LOCKWASHERS. REMOVE FUEL TRANSFER PUMP AND GASKET.

INSTALLATION

STEP 1. POSITION FUEL TRANSFER PUMP AND GASKET. INSTALL SCREWS AND LOCKWASHERS.

STEP 2. INSTALL FUEL LINES.

STEP 3. CONNECT TACHOMETER CABLE.

Figure 3-80. Fuel transfer pump; removal and installation.

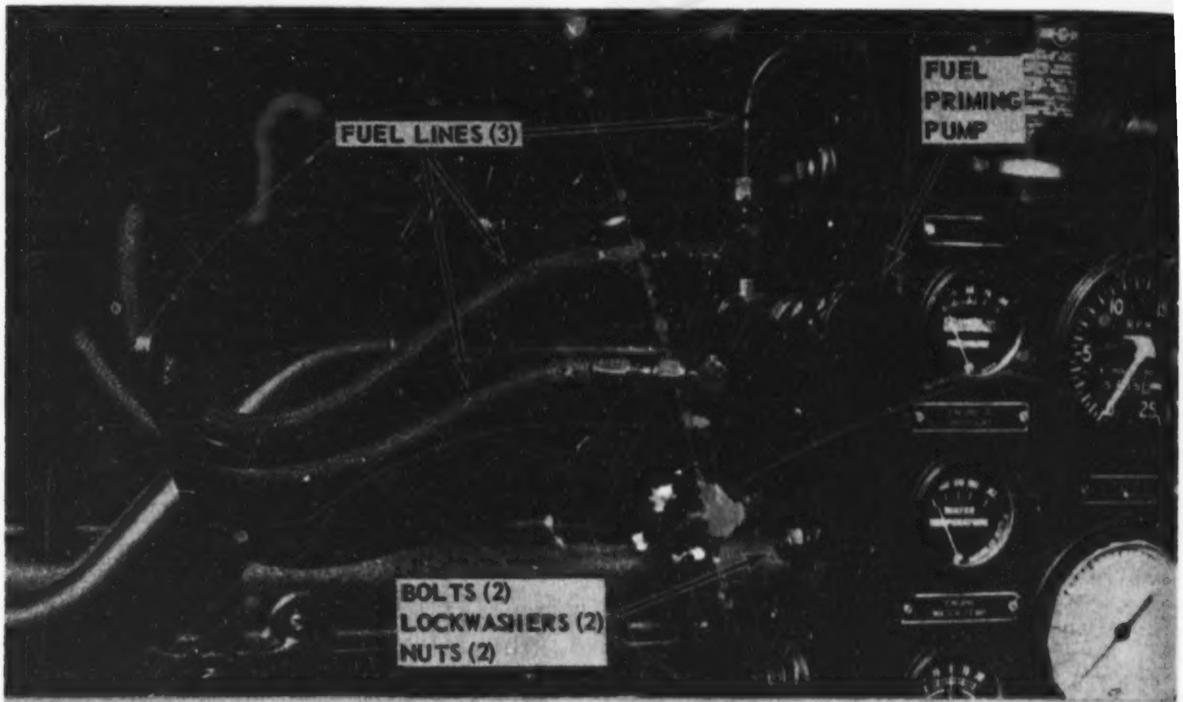
b. Installation.

(1) Install fuel transfer pump assembly as shown in figure 3-80.

(2) Install service meter (para 3-56).

3-96. Fuel Priming Pump

a. Removal. Remove fuel priming pump as shown i figure 3-81.


FUEL LINES (3)
FUEL PRIMING PUMP
BOLTS (2)
LOCKWASHERS (2)
NUTS (2)

ME 4310-338-15/3-81

REMOVAL

STEP 1. REMOVE FUEL LINES.

STEP 2. REMOVE BOLTS, LOCKWASHERS, AND NUTS. REMOVE PRIMING PUMP.

INSTALLATION

STEP 1. POSITION PRIMING PUMP. INSTALL BOLTS, LOCKWASHERS, AND NUTS.

STEP 2. INSTALL FUEL LINES.

Figure 3-81. Fuel priming pump; removal and installation.

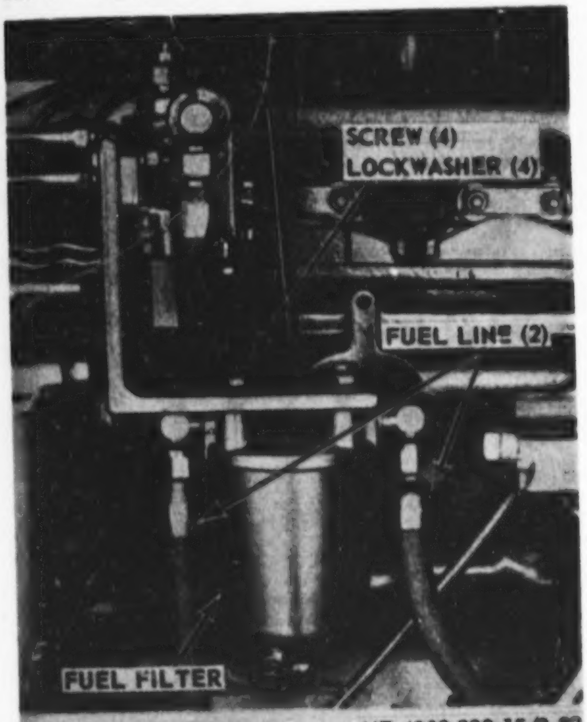
b. Installation. Install fuel priming pump as shown in figure 3-81.

3-97. Primary Fuel Filter Assembly

a. Removal.

(1) Open draincock and drain all fuel from primary fuel filter assembly.

(2) Remove primary fuel filter assembly as shown in figure 3-82.



ME 4310-338-15/3-82

REMOVAL

STEP 1. DISCONNECT FUEL LINES.

STEP 2. REMOVE SCREWS AND LOCKWASHERS. REMOVE FUEL FILTER.

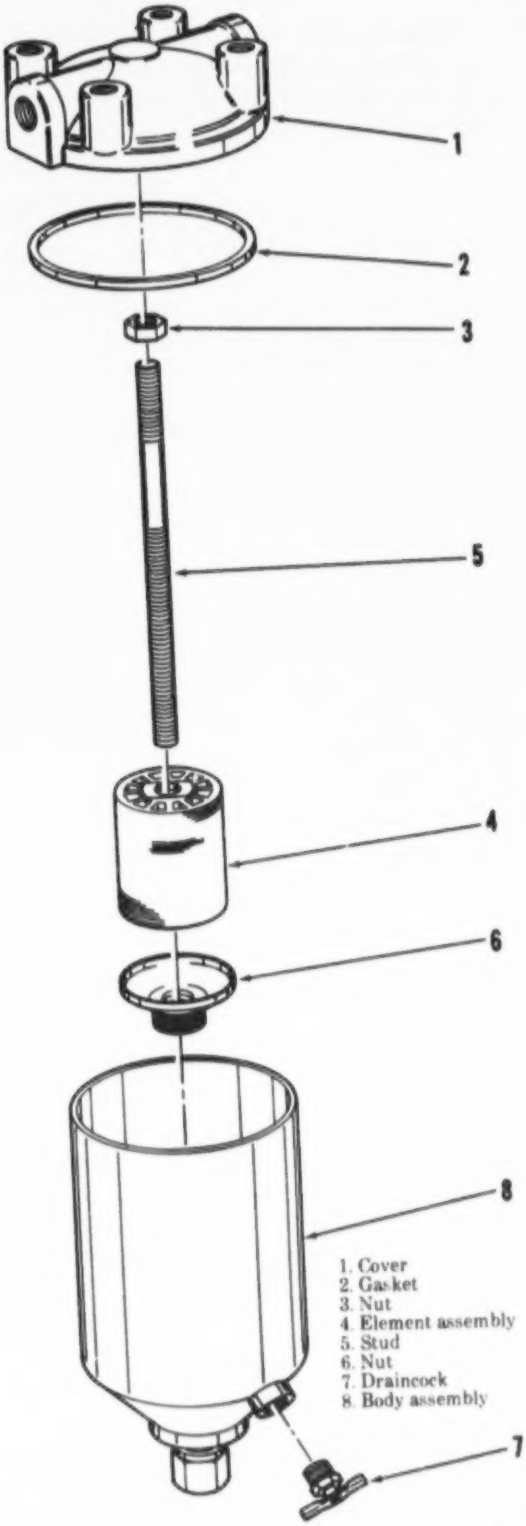
INSTALLATION

STEP 1. POSITION FUEL FILTER. INSTALL SCREWS AND LOCKWASHERS.

STEP 2. CONNECT FUEL LINES.

Figure 3-82. Primary fuel filter assembly; removal and installation.

b. Disassembly. Disassemble primary fuel filter assembly in numerical sequence shown in figure 3-83. Discard gasket.



1. Cover
2. Gasket
3. Nut
4. Element assembly
5. Stud
6. Nut
7. Draincock
8. Body assembly

ME 4310-338-15/3-83

Figure 3-83. Primary Fuel Filter Assembly; Disassembly and Reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect element for cracks, breaks, distortion, or any other defect.

(3) Inspect all other parts for cracks, distortion, excessive wear, or any other defect.

(4) Inspect attaching hardware for damaged threads, distortion, cracks, or any other defect.

d. Reassembly. Reassemble primary fuel filter assembly in reverse numerical sequence shown in figure 3-83. Install new gasket.

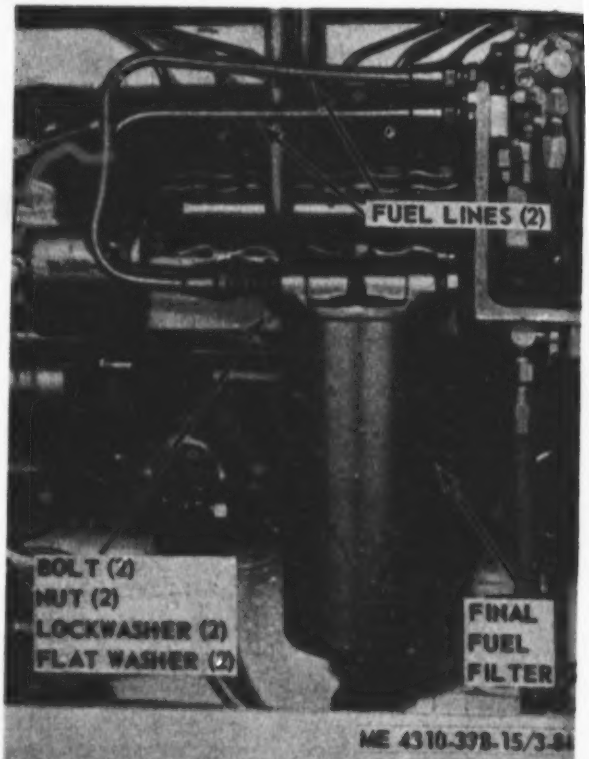
e. Installation. Install primary fuel filter assembly as shown in figure 3-82.

3-98. Final Fuel Filter Assembly

a. Removal.

(1) Open draincock and drain all fuel from final fuel filter assembly.

(2) Remove final fuel filter assembly as shown in figure 3-84.



REMOVAL

STEP 1. REMOVE FUEL LINES.

STEP 2. REMOVE BOLTS, NUTS, LOCKWASHERS AND FLAT WASHERS. REMOVE FUEL FILTER.

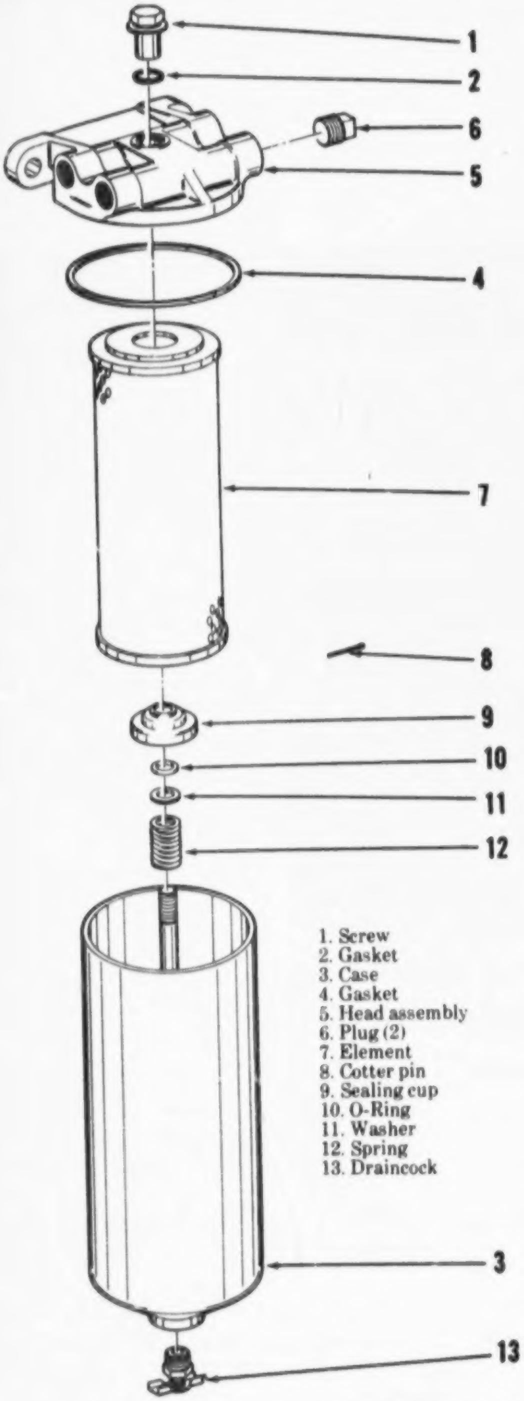
INSTALLATION

STEP 1. POSITION FUEL FILTER AND INSTALL BOLTS, NUTS, LOCKWASHERS, AND FLAT WASHERS.

STEP 2. INSTALL FUEL LINES.

Figure 3-84. Final Fuel Filter Assembly; Removal and Installation.

b. Disassembly. Disassemble final fuel filter assembly in numerical sequence shown in figure 3-85.



1. Screw
2. Gasket
3. Case
4. Gasket
5. Head assembly
6. Plug (2)
7. Element
8. Cotter pin
9. Sealing cup
10. O-Ring
11. Washer
12. Spring
13. Draincock

ME 4310-338-15/3-85

Figure 3-85. Final fuel filter assembly; disassembly and reassembly.

c. Cleaning and Inspection.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard element and gasket.

(2) Inspect spring, cotter pin, and retainers for cracks, breaks, distortion, or any other defect.

(3) Inspect cover for distortion, cracks, damaged threads, or any other defect.

(4) Inspect all other parts, including attaching hardware, for damaged threads, cracks, distortion, or any other defect.

d. Reassembly. Reassemble final fuel filter assembly in reverse numerical sequence shown in figure 3-85. Install new element and gasket.

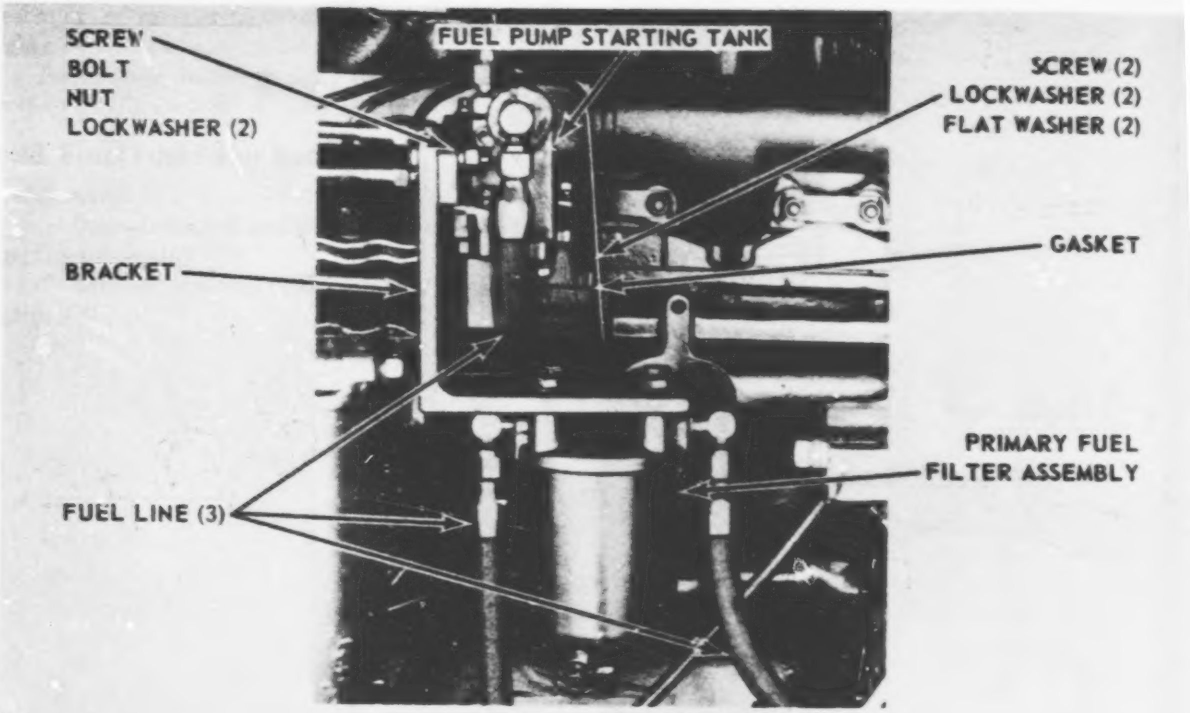
e. Installation. Install final fuel filter assembly as shown in figure 3-84.

3-99. Fuel Pump Starting Tank and Fuel Bypass Valve

a. Removal.

(1) Remove primary fuel filter assembly (pa 3-97).

(2) Remove fuel pump starting tank as sho in figure 3-86.


SCREW
BOLT
NUT
LOCKWASHER (2)
FUEL PUMP STARTING TANK
SCREW (2)
LOCKWASHER (2)
FLAT WASHER (2)
GASKET
BRACKET
PRIMARY FUEL FILTER ASSEMBLY
FUEL LINE (3)

ME 4310-338-15/3-86

REMOVAL

STEP 1. REMOVE PRIMARY FUEL FILTER BRACKET BY REMOVING SCREW, BOLT, NUT, AND LOCKWASHERS.

STEP 2. REMOVE FUEL LINES FROM FUEL PUMP STARTING TANK.

STEP 3. REMOVE SCREWS, LOCKWASHERS, AND FLAT WASHERS. REMOVE FUEL PUMP STARTING TANK AND GASKET.

INSTALLATION

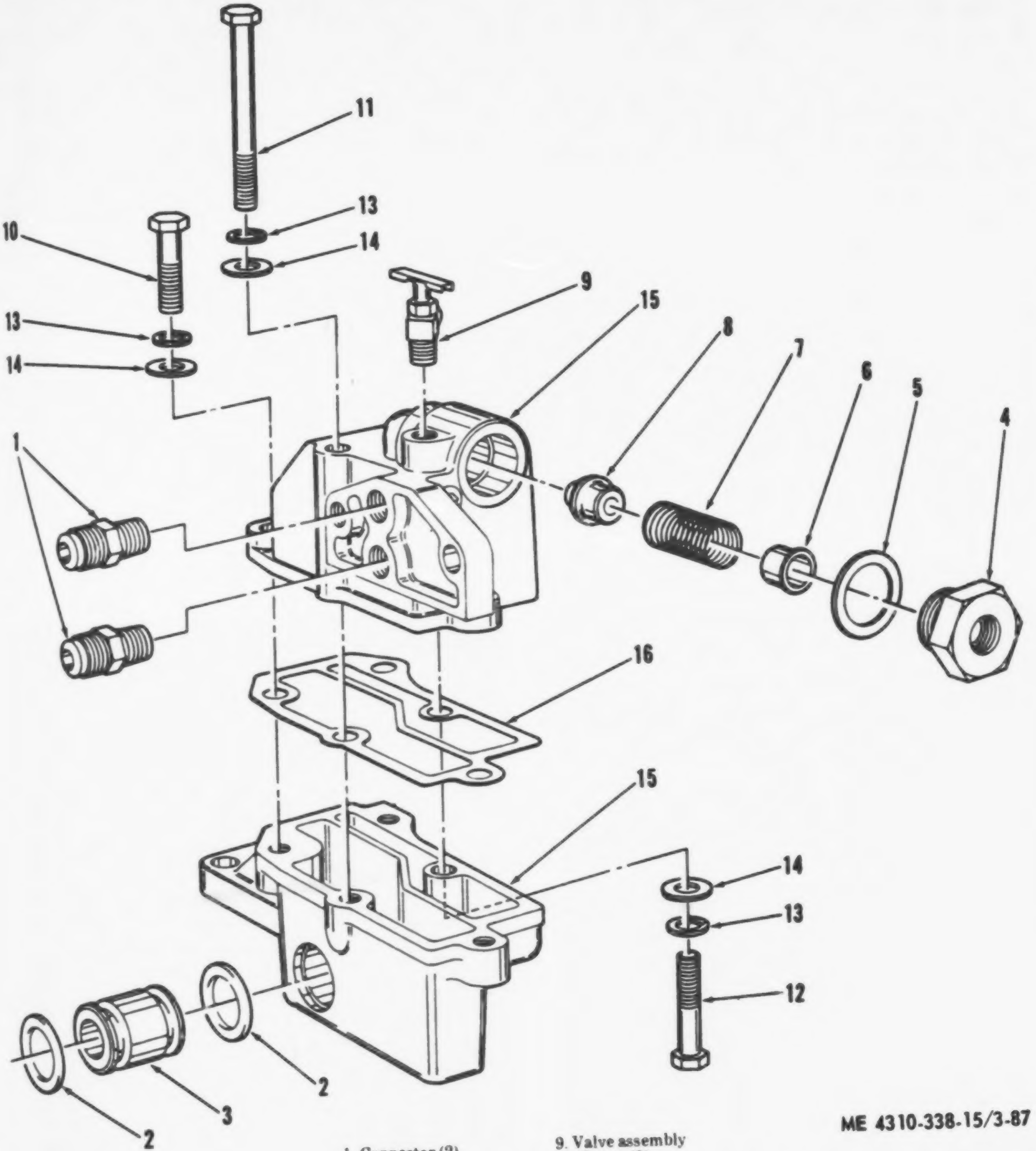
STEP 1. INSTALL A NEW GASKET. PLACE FUEL PUMP STARTING TANK IN MOUNTING POSITION AND SECURE WITH SCREWS. LOCKWASHERS, AND FLAT WASHERS.

STEP 2. INSTALL FUEL LINES TO FUEL PUMP STARTING TANK.

STEP 3. PLACE PRIMARY FUEL FILTER BRACKET IN MOUNTING POSITION AND SECURE WITH SCREW, BOLT, NUT, AND LOCKWASHERS.

Figure 3-86. Fuel pump starting tank; removal and installation.

b. Disassembly. Disassemble fuel pump starting tank and fuel bypass valve in numerical sequence shown in figure 3-87. Discard gasket.



ME 4310-338-15/3-87

1. Connector (2)
2. O-ring (2)
3. Sleeve
4. Fitting
5. Gasket
6. Stop
7. Spring
8. Plunger
9. Valve assembly
10. Screw (3)
11. Screw
12. Screw
13. Washer (5)
14. Washer (5)
15. Tank assembly
16. Gasket

Figure 3-87. Fuel Pump Starting Tank and Fuel Bypass Valve; Disassembly and Reassembly.

c. Cleaning and Inspection.

(1) Clean fuel bypass valve parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect spring for defective coils, cracks, distortion, or any other defect. Refer to table 5-2 for spring free length.

(3) Inspect valve for distortion, cracks, breaks, or any other defect.

(4) Inspect all other parts for cracks, breaks, distortion, or any other defects.

d. Reassembly. Reassemble fuel pump starting tank and fuel bypass valve in reverse numerical sequence shown in figure 3-87. Install a new gasket.

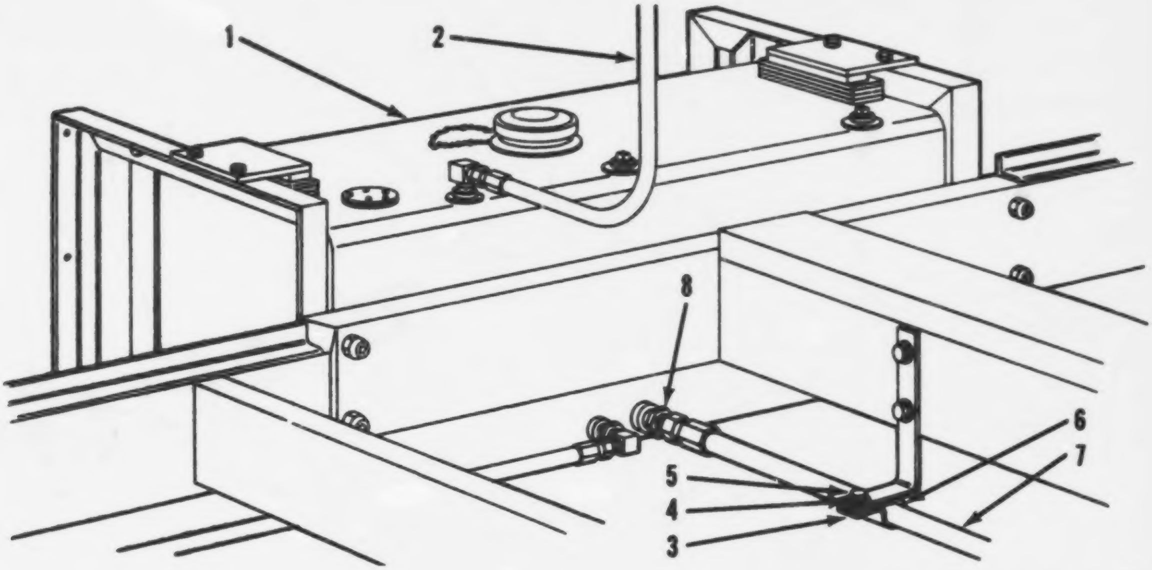
e. Installation.

(1) Install fuel pump starting tank as shown in figure 3-86.

(2) Install primary fuel filter assembly (para 3-97).

3-100. Fuel Lines and Fittings

a. Removal. Remove fuel lines and fittings by following numerical sequence shown in figure 3-88.



ME 4310-338-15/3-88 ①

1.Fuel tank (ref)
3. Hose assembly
3. Nut
4. Washer
5. Bolt
6. Hose clip
7. Hose assembly
8. Connector (2)
9. dscrew (2)
10. Lockwasher (2)
11. Hose clip (2)
12. Hose assembly
13. Hose assembly
14. Connector
15. Elbow
16. Fuel priming pump (ref)
17. Hose assembly
8. Hose assembly
19. Primary fuel filter (ref)
20. Elbow (2)
21. Fuel transfer pump (ref)
22. Connector (2)
23. Connector
24. Bolt (4)
25. Nut (4)
26. Lockwasher (4)
27. Clip (4)
28. Fuel line (6)
29. Fuel injection valve (ref)
30. Fuel injection pump housing (ref)
31. Elbow
32. Hose assembly
33. Tube assembly (2)
34. Connector (4)
35. Final fuel filter (ref)

Figure 3-88. Fuel lines and fittings, removal and installation (sheet 1 of 4).

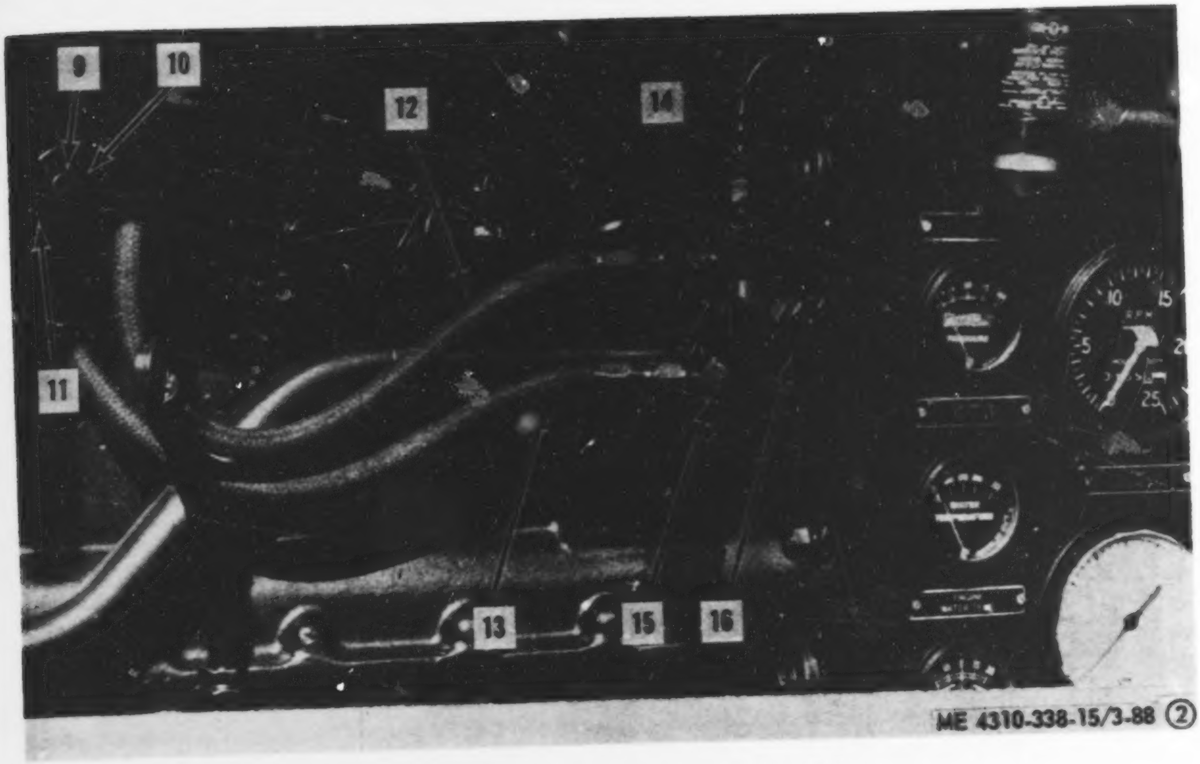

9
10
12
14
11
13
15
16
ME 4310-338-15/3-88 ②

Figure 3-88. Fuel lines and fittings, removal and installation (sheet 2 of 4).

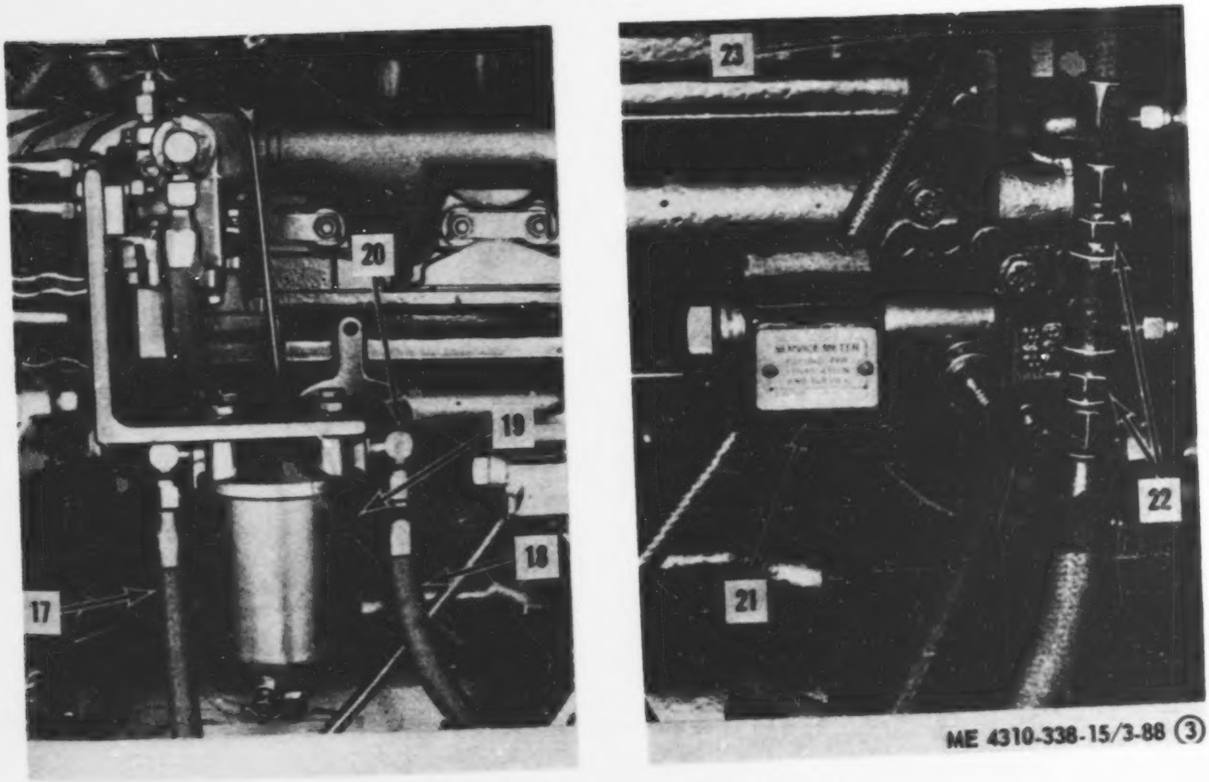

20
19
18
17
23
SERVICE METER
22
21
ME 4310-338-15/3-88 ③

Figure 3-88. Fuel lines and fittings, removal and installation (sheet 3 of 4).

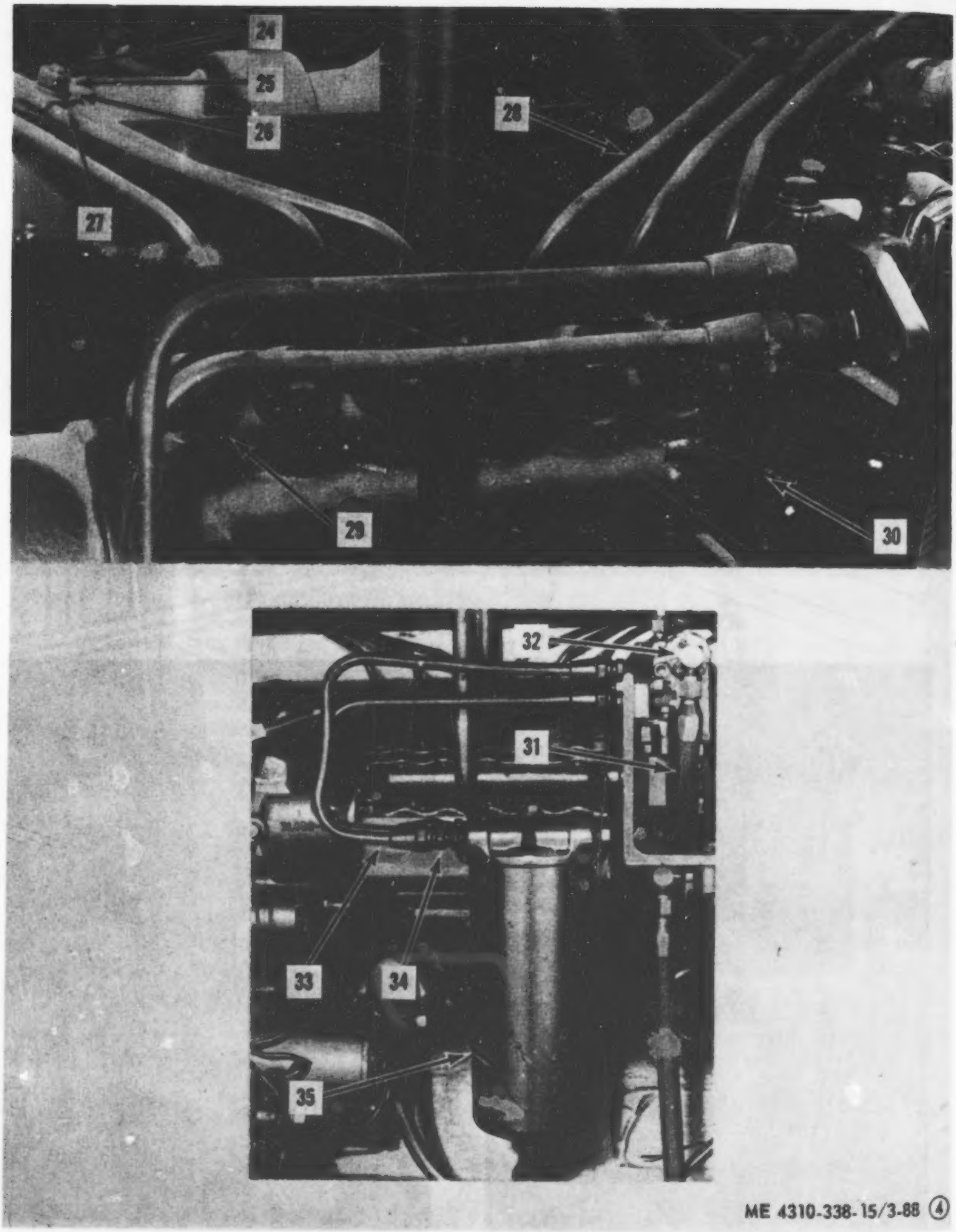

24
25
26
27
28
29
30
32
31
33
34
35
ME 4310-338-15/3-88 ④

Figure 3-88. Fuel lines and fittings, removal and installation (sheet 4 of 4).

b. Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect lines and fittings for cracks, breaks, distortion, kinks, or any other defect.

(3) Inspect all other attaching hardware and threaded parts for damaged threads, cracks, breaks, distortion, or any other defect.

c. Installation. Install fuel lines and fittings by following reverse numerical sequence shown in figure 3-88.

Section XV. ENGINE ELECTRICAL SYSTEM

3-101. General

The engine 24-volt electrical system consists of a generator, generator regulator, starting motor, and four batteries. The generator restores electrical energy to the batteries and supplies electrical power to meet the load demands of the engine and accessories when the air compressor unit is operating. The batteries supply power to the starting motor and to the electrical accessories when the unit is not operating. The generator regulator opens and closes the charging circuit, prevents overcharging of the batteries and damaging high voltage in the system, and maintains the generator output within its rated limits. The starting motor engages the gear ring on the flywheel and turns the engine over for starting.

3-102. Generator Assembly

a. Removal.

(1) Disconnect battery cables.

(2) Remove shielded cable from generator assembly.

(3) Remove generator assembly as shown in figure 3-89.

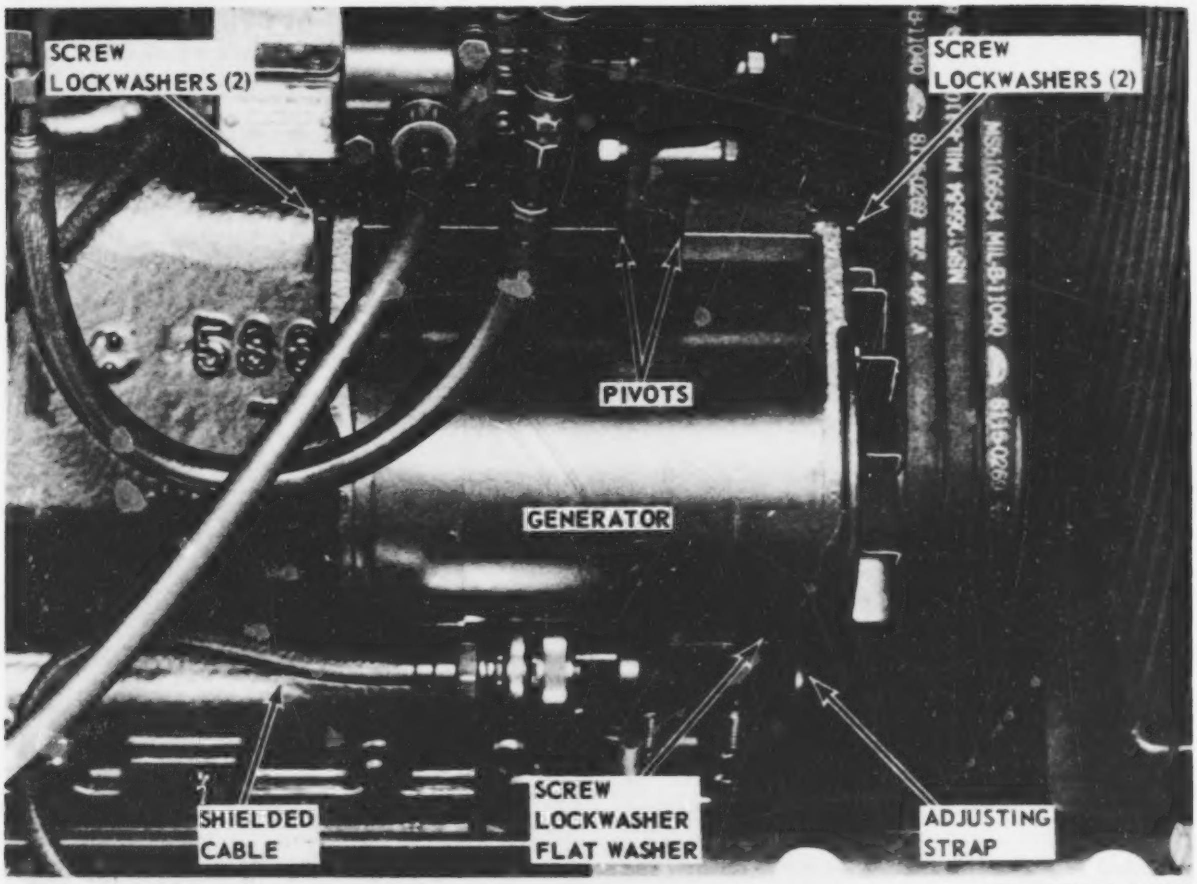
b. Cleaning and Inspection.

(1) Clean exterior surfaces of generator assembly using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry generator thoroughly. Blow dust and dirt out of inside of generator using dry compressed air.

(2) Inspect brushes for excessive wear, cracks, or any other defect. Replace brushes as a set.

(3) Inspect drive belts for cracks, wear, or any other defect.

(4) Inspect attaching hardware for damaged threads, cracks, distortion, or any other defect.


SCREW
LOCKWASHERS (2)
SCREW
LOCKWASHERS (2)
PIVOTS
GENERATOR
SHIELDED CABLE
SCREW
LOCKWASHER
FLAT WASHER
ADJUSTING STRAP
ME 4310-338-15/3-89

REMOVAL

STEP 1. DISCONNECT SHIELDED CABLE.

STEP 2. REMOVE SCREW, LOCKWASHER, AND FLAT WASHER FROM ADJUSTING STRAP

STEP 3. REMOVE SCREWS AND LOCKWASHERS FROM PIVOTS. REMOVE GENERATOR.

INSTALLATION

STEP 1. POSITION GENERATOR ON PIVOTS AND INSTALL SCREWS AND LOCKWASHERS.

STEP 2. INSTALL SCREW, LOCKWASHER, AND FLAT WASHER ON ADJUSTING STRAP.

STEP 3. CONNECT SHIELDED CABLE.

Figure 3-89. Generator assembly; removal and installation.

c. Installation.

(1) Install generator assembly as shown in figure 3-89.

(2) Adjust drive belt tension (fig. 3-47).

(3) Connect shielded cable to generator assembly.

(4) Connect battery cables.

CAUTION

Failure to polarize generator may result in damage to generator and generator regulator since reversed generator polarity causes arcing and burning of cutout relay contact points and subsequent generator motoring.

(5) Polarize generator before engine is started. To achieve polarization, disconnect cable from generator. Momentarily touch a jumper wire from positive side of batteries to field terminal (B) on generator. Reconnect cable to generator.

3-103. Generator Pulley

a. Removal.

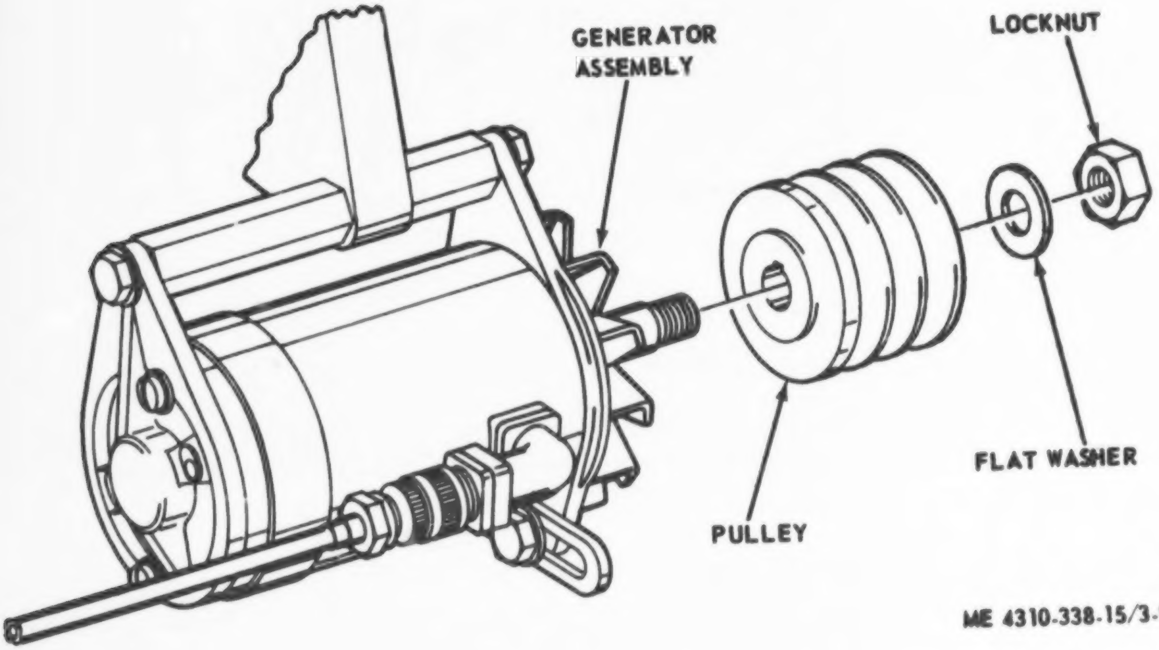
(1) Remove drive belts (para 3-72).

(2) Remove generator pulley as shown in figure 3-90.

b. Installation.

(1) Install generator pulley as shown in figure 3-90.

(2) Install and adjust drive belts (para 3-72).



REMOVAL

REMOVE LOCKNUT AND FLAT WASHER AND REMOVE GENERATOR PULLEY.

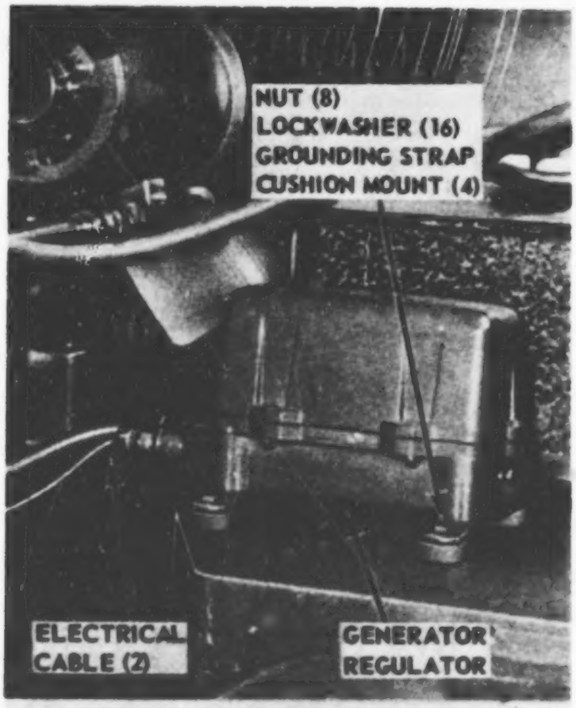
INSTALLATION

PLACE GENERATOR PULLEY IN MOUNTING POSITION AND SECURE WITH LOCKNUT AND FLAT WASHER.

Figure 3-90. Generator pulley; removal and installation.

3-104. Generator Regulator Assembly

a. Removal. Remove generator regulator assembly as shown in figure 3-91.


NUT (8)
LOCKWASHER (16)
GROUNDING STRAP
CUSHION MOUNT (4)
ELECTRICAL CABLE (2)
GENERATOR REGULATOR

ME 4310-338-15/3-91

REMOVAL

STEP 1. DISCONNECT ELECTRICAL CABLES.

STEP 2. REMOVE NUTS, LOCKWASHERS, GROUNDING STRAP, AND CUSHION MOUNTS. REMOVE GENERATOR REGULATOR.

INSTALLATION

STEP 1. POSITION GENERATOR REGULATOR. INSTALL NUTS, LOCKWASHERS, GROUNDING STRAP, AND CUSHION MOUNTS.

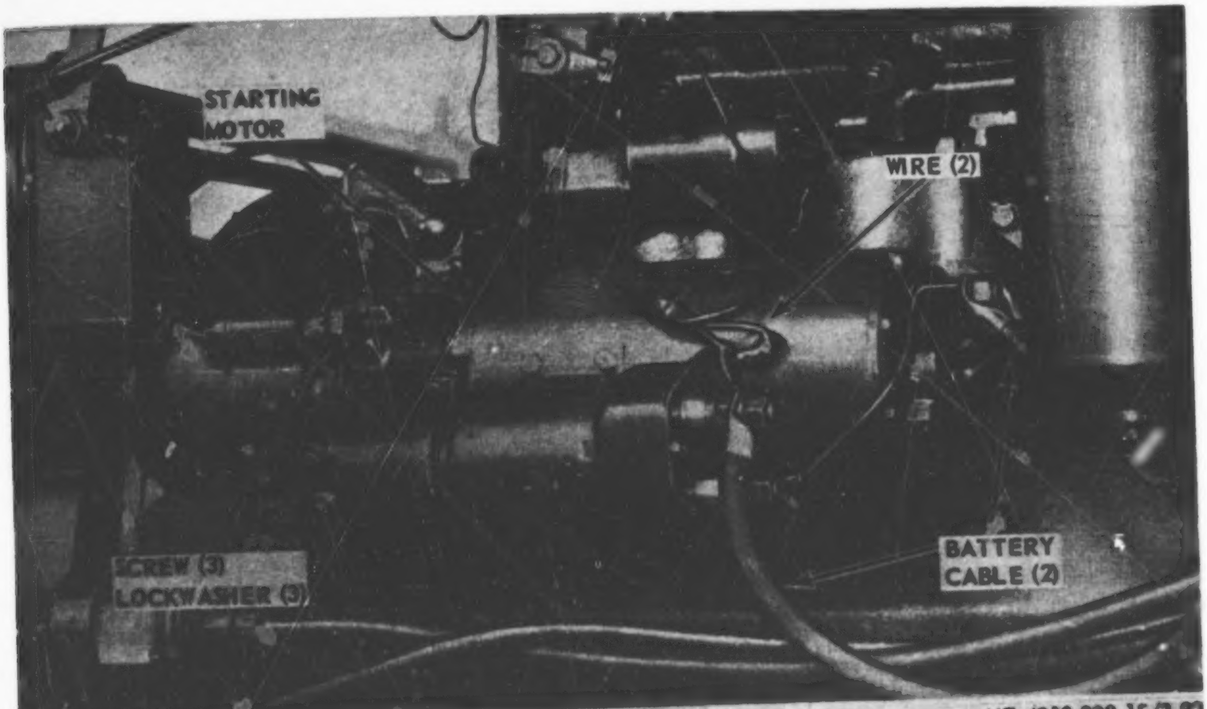
STEP 2. CONNECT ELECTRICAL CABLES.

Figure 3-91. Generator regulator assembly; removal and installation.

b. Installation. Install generator regulator assembly as shown in figure 3-91.

3-105. Starting Motor Assembly

a. Removal. Remove starting motor assembly as shown in figure 3-92.



ME 4310-338-15/3-92

REMOVAL

STEP 1. DISCONNECT GROUND CABLE FROM BATTERY.

STEP 2. DISCONNECT WIRING HARNESS WIRES.

STEP 3. DISCONNECT BATTERY CABLES.

STEP 4. REMOVE SCREWS AND LOCKWASHERS. REMOVE STARTING MOTOR.

INSTALLATION

STEP 1. PLACE STARTING MOTOR IN MOUNTING POSITION AND SECURE WITH SCREWS AND LOCKWASHERS.

STEP 2. CONNECT BATTERY CABLES.

STEP 3. CONNECT WIRING HARNESS WIRES.

STEP 4. CONNECT BATTERY GROUND CABLE.

Figure 3-92. Starting motor assembly; removal and installation

b. Cleaning and Inspection.

(1) Clean exterior surfaces of starting motor using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry starting motor thoroughly. Blow dust or dirt out of inside of starting motor using dry compressed air. Discard mounting gasket.

(2) Inspect clutch for chipped or cracked teeth, distortion, or any other defect.

(3) Inspect attaching hardware for damaged threads, distortion, breaks, or any other defect.

(4) Inspect brushes and springs for excessive wear, cracks, or any other defect.

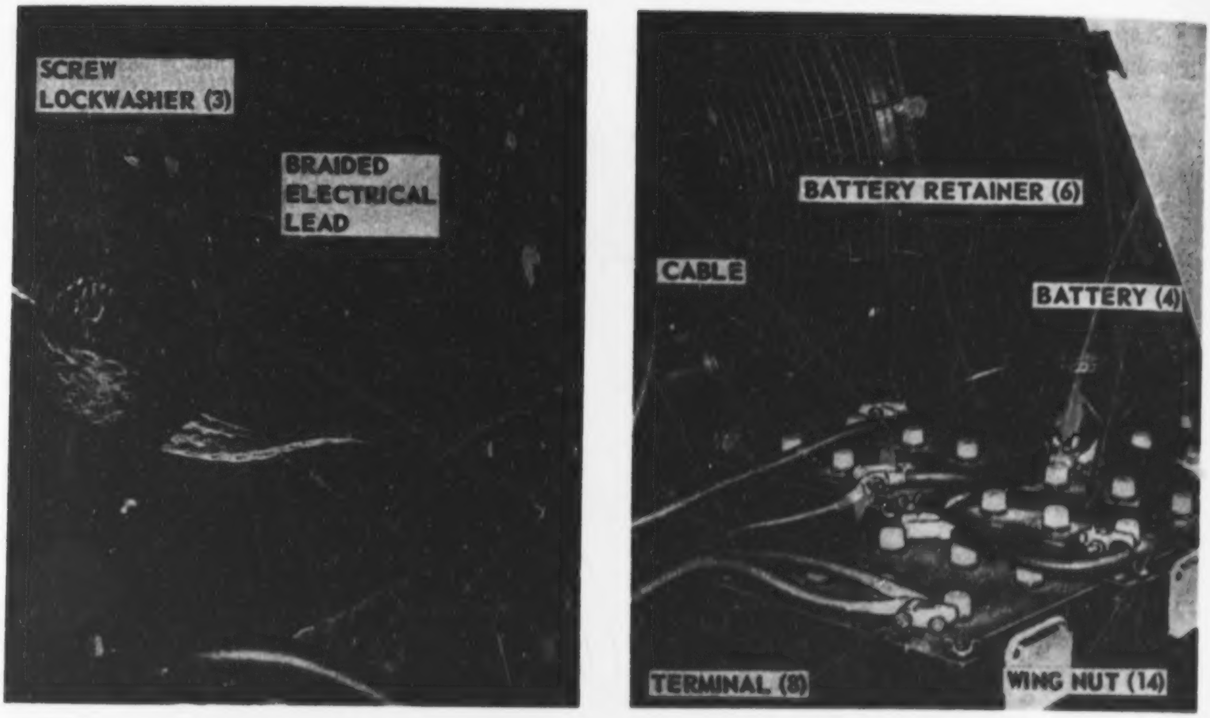
c. Installation. Install starting motor assembly as shown in figure 3-92. Install new gasket.

3-106. Batteries and Cables

WARNING

Do not smoke or allow open flames near charging batteries. Serious injury from explosion and acid may result. Avoid spilling electrolyte on clothing or flesh; acid causes severe burns.

a. Removal. Remove batteries and cables as shown in figure 3-93.


SCREW
LOCKWASHER (3)
BRAIDED ELECTRICAL LEAD
BATTERY RETAINER (6)
CABLE
BATTERY (4)
TERMINAL (8)
WING NUT (14)

ME 4310-338-15/3-93 ①

REMOVAL

STEP 1. REMOVE SCREW AND LOCKWASHERS FROM BRAIDED ELECTRICAL LEAD. REMOVE LEAD.

STEP 2. LOOSEN BATTERY TERMINAL BOLTS AND NUTS. REMOVE CABLES AND TERMINALS FROM BATTERIES. REMOVE CABLES FROM TERMINALS.

STEP 3. REMOVE NUTS AND WASHERS FROM STARTING MOTOR. REMOVE CABLES.

STEP 4. REMOVE WING NUTS AND BATTERY RETAINERS. REMOVE BATTERIES.

INSTALLATION

STEP 1. INSTALL BATTERIES ON TRAY. INSTALL BATTERY RETAINERS AND SECURE WITH WING NUTS.

STEP 2. INSTALL CABLES AND TERMINALS ON BATTERY POSTS (SEE FIG. 1-3). SECURE WITH BOLTS AND NUTS.

STEP 3. INSTALL CABLES ON STARTING MOTOR AND SECURE WITH NUTS AND WASHERS.

STEP 4. SECURE BRAIDED ELECTRICAL LEAD AND BATTERY CHARGING RECEPTACLE LEAD TO GROUND USING SCREW AND LOCKWASHERS.

Figure 3-93. Batteries and cables, removal and installation (sheet 1 of 2)

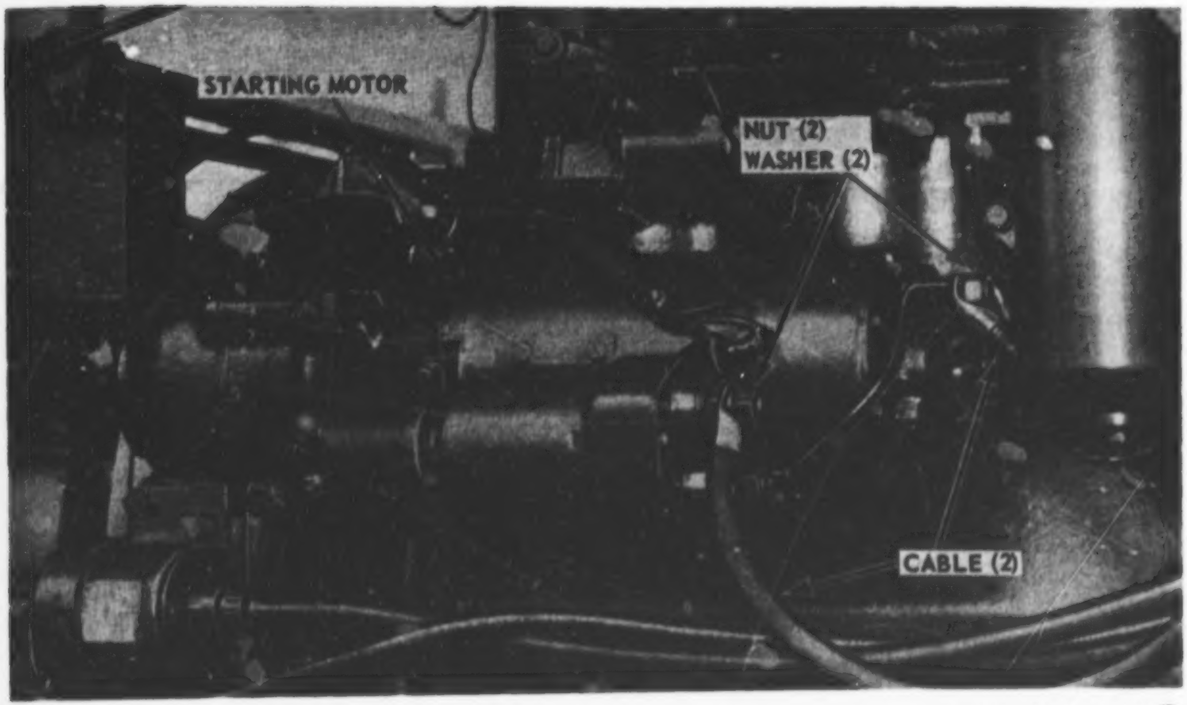


Figure 3-93 Batteries and cables; removal and installation (sheet 2 of 2).

b. Cleaning, Inspection, and Testing.

(1) Clean batteries and cables using a clean cloth dampened with a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Refer to TM 9-6140-200-15 and test batteries.

(3) Inspect batteries for cracks, loose posts, or any other defect.

(4) Inspect cables for wear, loose lugs, corrosion, or any other defect.

(5) Perform hydrometer test (para 2-1).

c. Installation. Install batteries and cables as shown in figure 3-93.

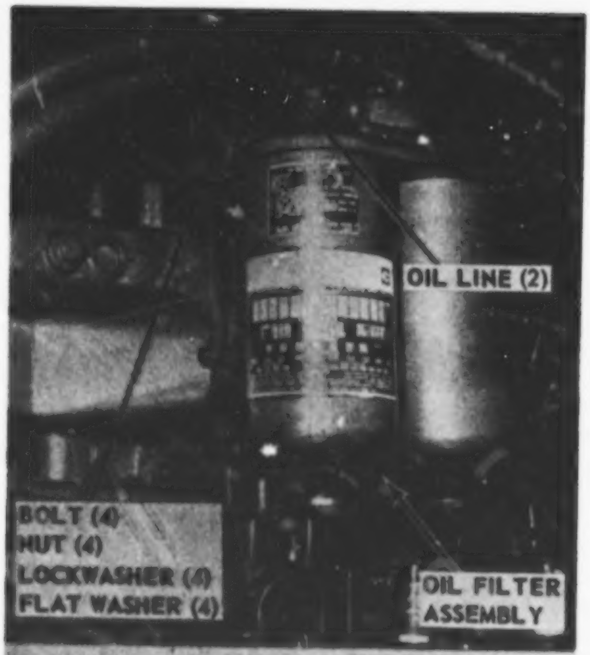
Section XVI. ENGINE LUBRICATING SYSTEM

3-107. General

The engine lubricating system consists of a gear-type oil pump, the oil filter assembly, oil cooler, oil filler and crankcase breather, and associated lines and fittings. The oil pump draws oil from the oil pan and supplies lubrication, under pressure, throughout the engine. Most of the contamination that is picked up by the oil as it passes through the engine is removed by the oil filter. Depending on oil temperature, the oil coming out of the filter is routed either into the engine, or through the oil cooler, then into the engine. Engine lubricant flowing through the oil cooler serves to cool the lubricating oil. When the engine is running, the crankcase breather permits air movement within the lubricating system. Fumes from the crankcase are dispersed to the atmosphere through a tube connected to the breather.

3-108. Engine Oil Filter Assembly

a. Removal. Remove engine oil filter assembly as shown in figure 3-94.


OIL LINE (2)
BOLT (4)
NUT (4)
LOCKWASHER (4)
FLAT WASHER (4)
OIL FILTER ASSEMBLY

ME 4310-338-15/3-94

REMOVAL

STEP 1. DISCONNECT OIL LINES.

STEP 2. REMOVE BOLTS, FLAT WASHERS, LOCKWASHERS, AND NUTS. REMOVE OIL FILTER.

INSTALLATION

STEP 1. POSITION OIL FILTER AND INSTALL BOLTS, FLAT WASHERS, LOCKWASHER, AND NUTS.

STEP 2. CONNECT OIL LINES.

Figure 3-94. Engine oil filter assembly; removal and installation

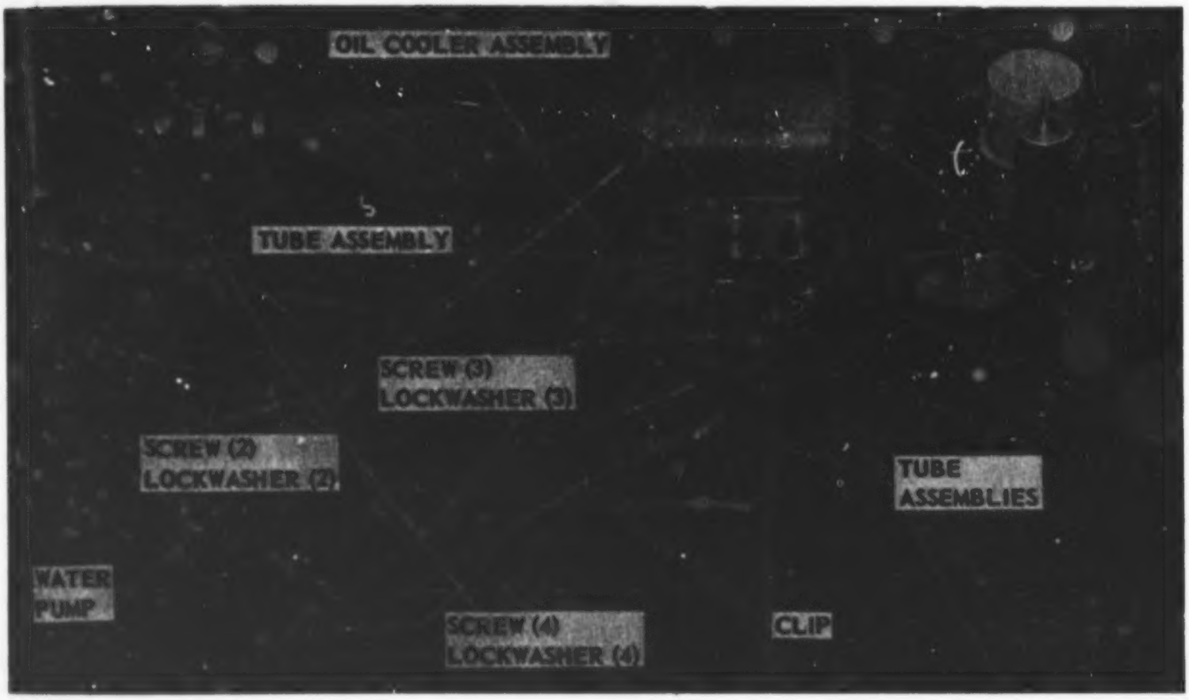
b. Installation. Install engine oil filter assembly as shown in figure 3-94.

3-109. Engine Oil Cooler Assembly

a. Removal.

(1) Remove engine oil filter assembly (para 3-108).

(2) Remove engine oil cooler assembly as shown in figure 3-95.


OIL COOLER ASSEMBLY
TUBE ASSEMBLY
SCREW (3)
LOCKWASHER (3)
SCREW (2)
LOCKWASHER (2)
TUBE
ASSEMBLIES
WATER
PUMP
SCREW (4)
LOCKWASHER (4)
CLIP

ME 4310-338-15/3-95

REMOVAL

STEP 1. REMOVE TUBE ASSEMBLY FROM ELBOW AND ENGINE.

STEP 2. REMOVE SCREWS AND LOCKWASHERS SECURING ELBOW TO WATER PUMP.

STEP 3. REMOVE SCREWS AND LOCKWASHERS SECURING TUBE ASSEMBLIES TO ENGINE. REMOVE CLIP.

STEP 4. REMOVE SCREWS AND LOCKWASHERS SECURING OIL COOLER TO ENGINE. REMOVE OIL COOLER.

INSTALLATION

STEP 1. PLACE OIL COOLER IN MOUNTING POSITION AND SECURE WITH SCREWS AND LOCKWASHERS.

STEP 2. INSTALL CLIP. SECURE TUBE ASSEMBLIES USING SCREWS AND LOCKWASHERS.

STEP 3. SECURE ELBOW TO WATER PUMP USING SCREWS AND LOCKWASHERS.

STEP 4. INSTALL TUBE ASSEMBLY.

Figure 3-95. Engine oil cooler assembly; removal and installation

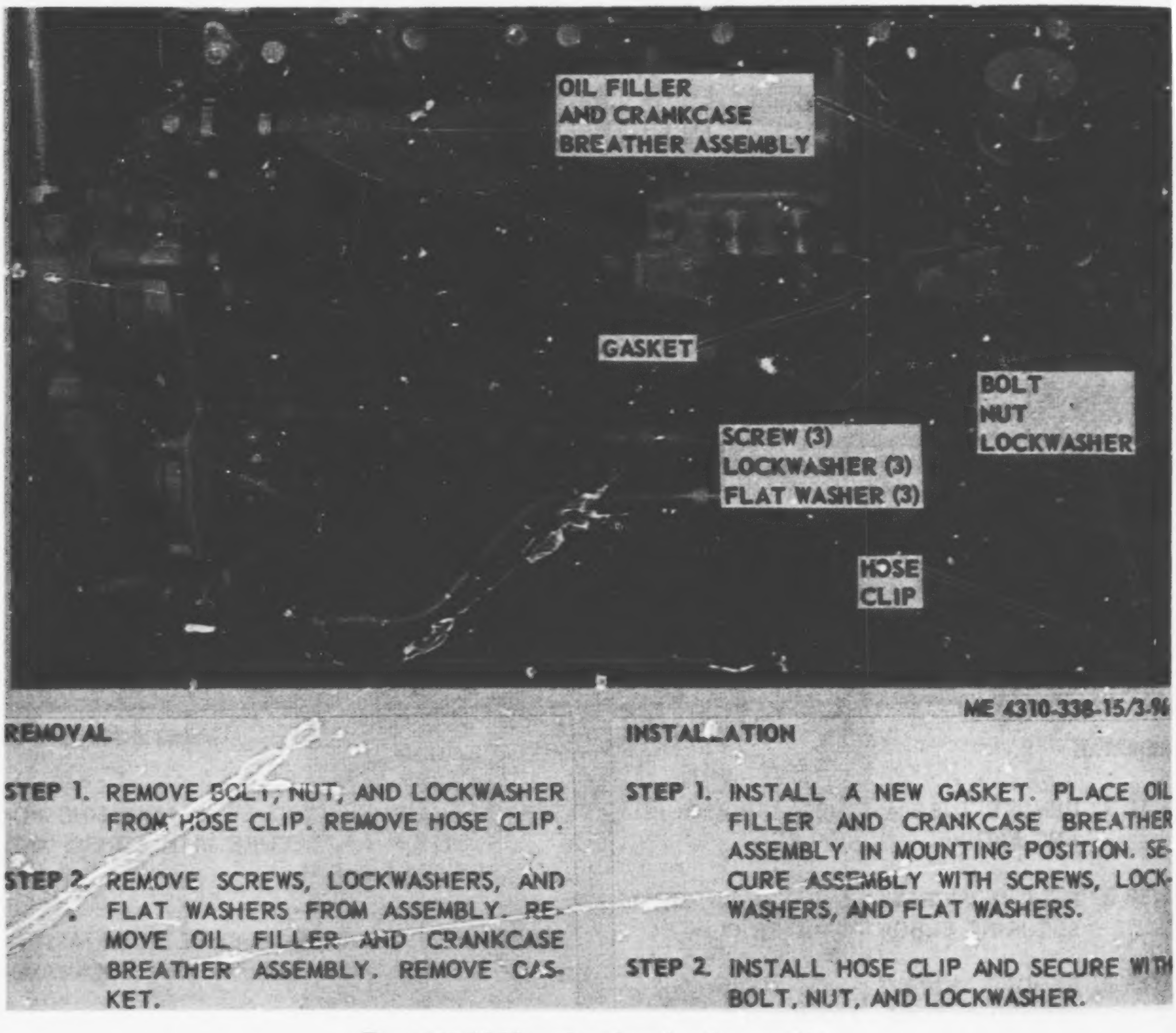
b. Installation.

(a) Install engine oil cooler assembly as shown in figure 3-95.

(2) Install engine oil filter assembly (para 3-108).

3-110. Oil Filler and Crankcase Breathe Assembly

a. Removal. Remove oil filler and crankcase breather assembly as shown in figure 3-96.


OIL FILLER AND CRANKCASE BREATHER ASSEMBLY
GASKET
BOLT
NUT
LOCKWASHER
SCREW (3)
LOCKWASHER (3)
FLAT WASHER (3)
HOSE CLIP
ME 4310-338-15/3-96

REMOVAL

STEP 1. REMOVE BOLT, NUT, AND LOCKWASHER FROM HOSE CLIP. REMOVE HOSE CLIP.

STEP 2. REMOVE SCREWS, LOCKWASHERS, AND FLAT WASHERS FROM ASSEMBLY. REMOVE OIL FILLER AND CRANKCASE BREATHER ASSEMBLY. REMOVE GASKET.

INSTALLATION

STEP 1. INSTALL A NEW GASKET. PLACE OIL FILLER AND CRANKCASE BREATHER ASSEMBLY IN MOUNTING POSITION. SECURE ASSEMBLY WITH SCREWS, LOCKWASHERS, AND FLAT WASHERS.

STEP 2. INSTALL HOSE CLIP AND SECURE WITH BOLT, NUT, AND LOCKWASHER.

Figure 3-96. Oil filler and crankcase breather assembly; removal and installation.

b. Disassembly. Disassemble oil filler and crankcase breather assembly in numerical sequence shown in figure 3-97.

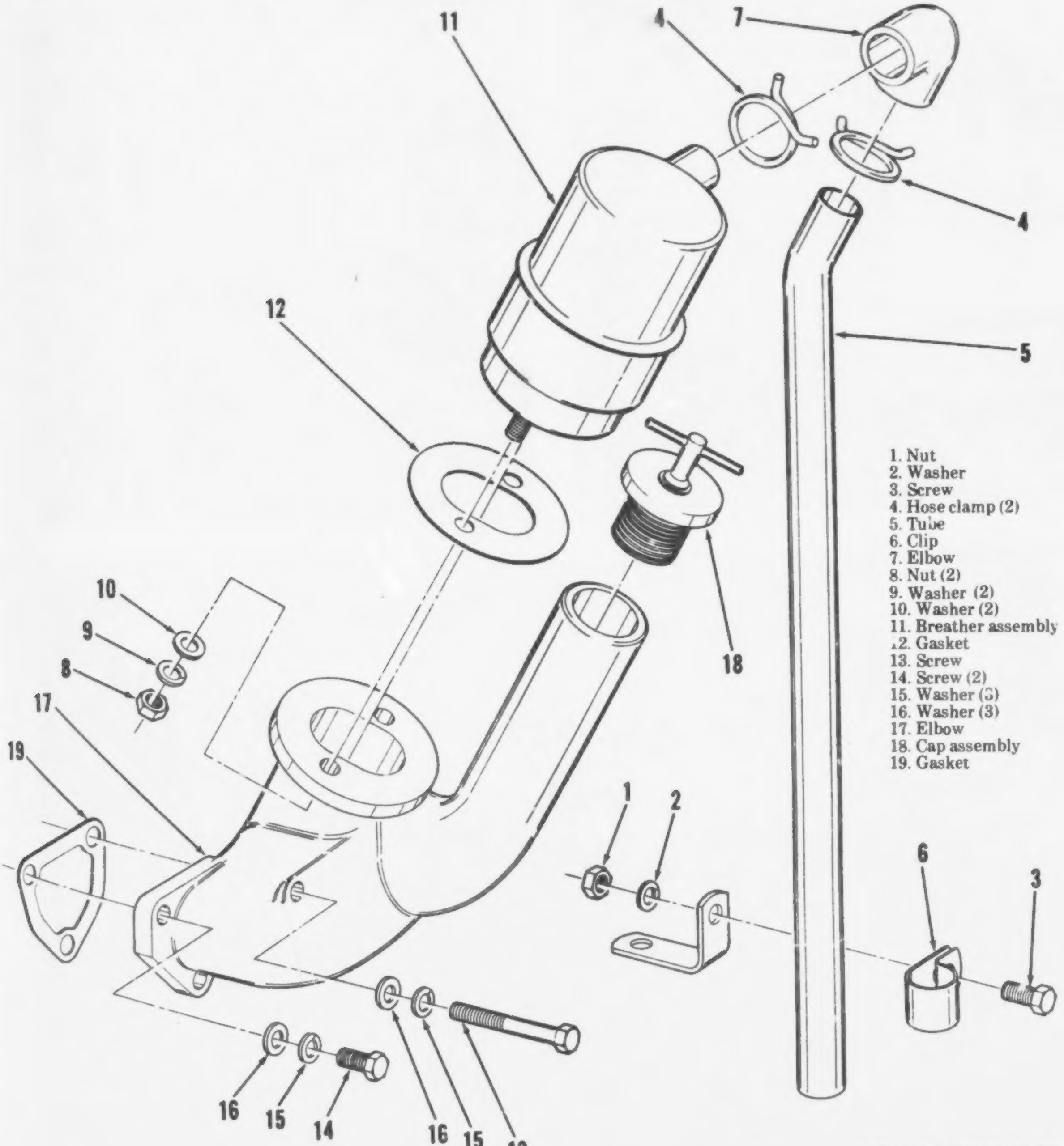
c. Cleaning and Inspection.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Clean breather element in clean diesel fuel and dry thoroughly.

(3) Inspect all parts for cracks, breaks, distortion, or any other defect.

d. Reassembly. Reassemble oil filler and crankcase breather assembly in reverse numerical sequence shown in figure 3-97.



1. Nut
2. Washer
3. Screw
4. Hose clamp (2)
5. Tube
6. Clip
7. Elbow
8. Nut (2)
9. Washer (2)
10. Washer (2)
11. Breather assembly
12. Gasket
13. Screw
14. Screw (2)
15. Washer (3)
16. Washer (3)
17. Elbow
18. Cap assembly
19. Gasket

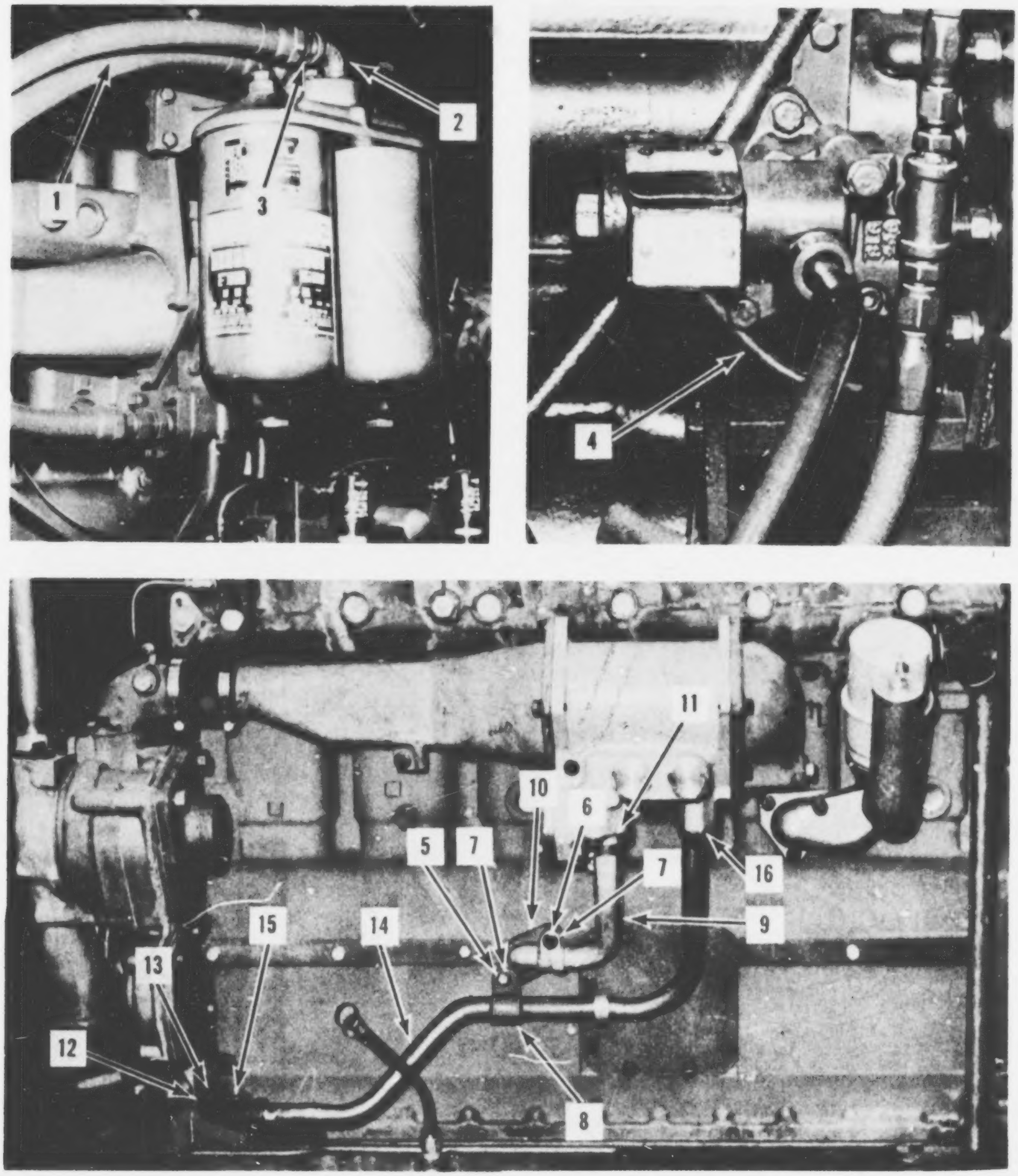
ME 4310-338-15/3-97

Figure 3-97. Oil filler and crankcase breather assembly; Disassembly and reassembly.

e. Installation. Install oil filler and crankcase breather assembly as shown in figure 3-96.

3-111. Engine Oil Lines and Fittings

a. Removal. Remove engine oil lines and fittings by following numerical sequence shown in figure 3-98.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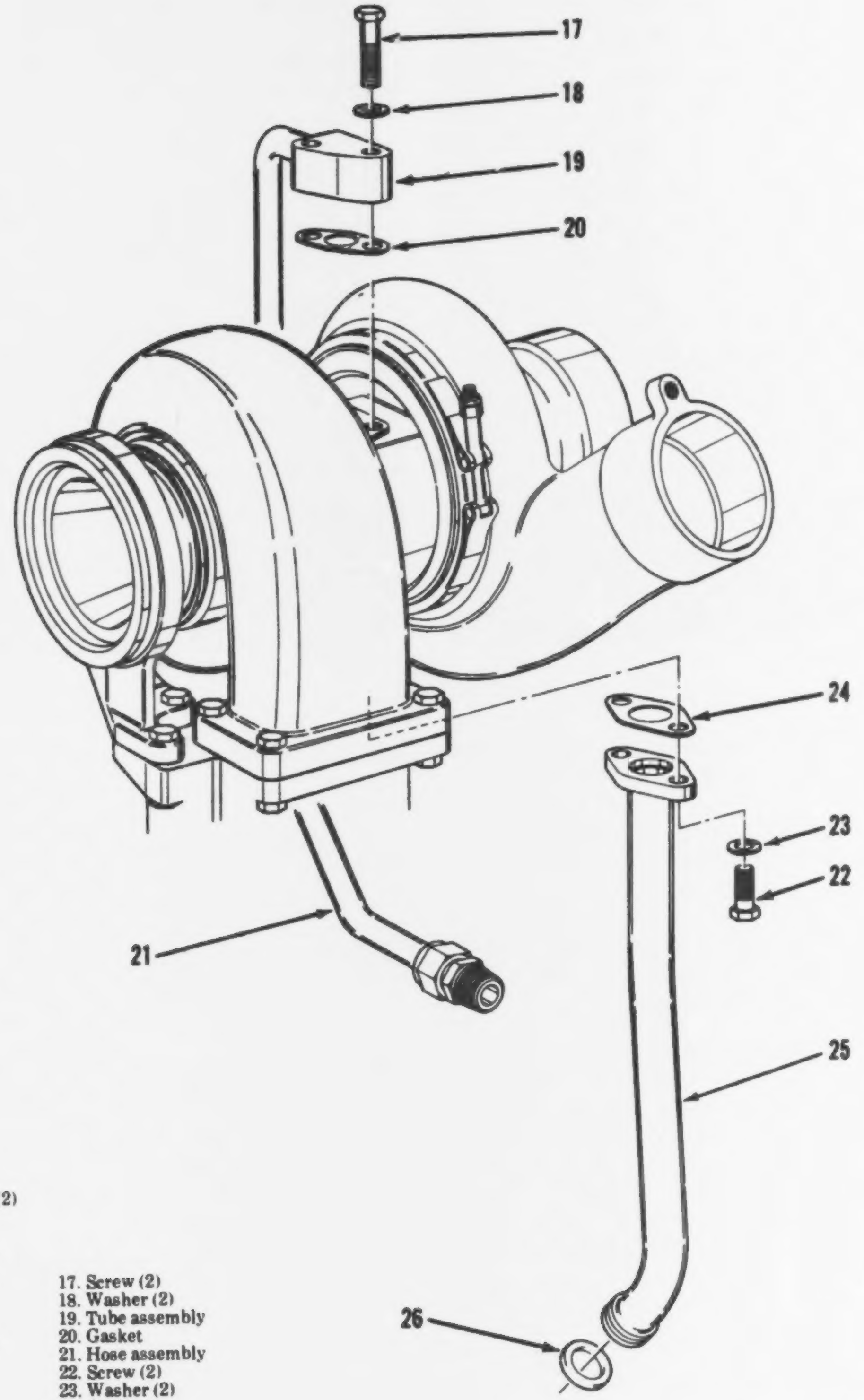
ME 4310-338-15/3-98 ①

Figure 3-98. Engine oil lines and fittings removal and installation (sheet 1 of 2).


17
18
19
20
24
23
22
21
25
26
ME 4310-338-15/3-98 ②

1. Hose assembly (2)
2. Elbow (2)
3. Connector (2)
4. Tube assembly
5. Screw
6. Screw
7. Washer (2)
8. Hose clip
9. Tube assembly
10. Gasket
11. O-Ring
12. Screw (2)
13. Washer (2)
14. Tube assembly
15. Gasket
16. O-Ring
17. Screw (2)
18. Washer (2)
19. Tube assembly
20. Gasket
21. Hose assembly
22. Screw (2)
23. Washer (2)
24. Gasket
25. Tube assembly
26. O-Ring

Figure 3-98. Engine oil lines and fitting, removal and installation (sheet 2 of 2).

b. Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect lines and fittings for cracks, breaks, distortion, kinks, or any other defects.

(3) Inspect all other attaching hardware and threaded parts for damaged threads, cracks, breaks, distortion, or any other defect.

c. Installation. Install oil lines and fittings by following reverse numerical sequence shown in figure 3-98.

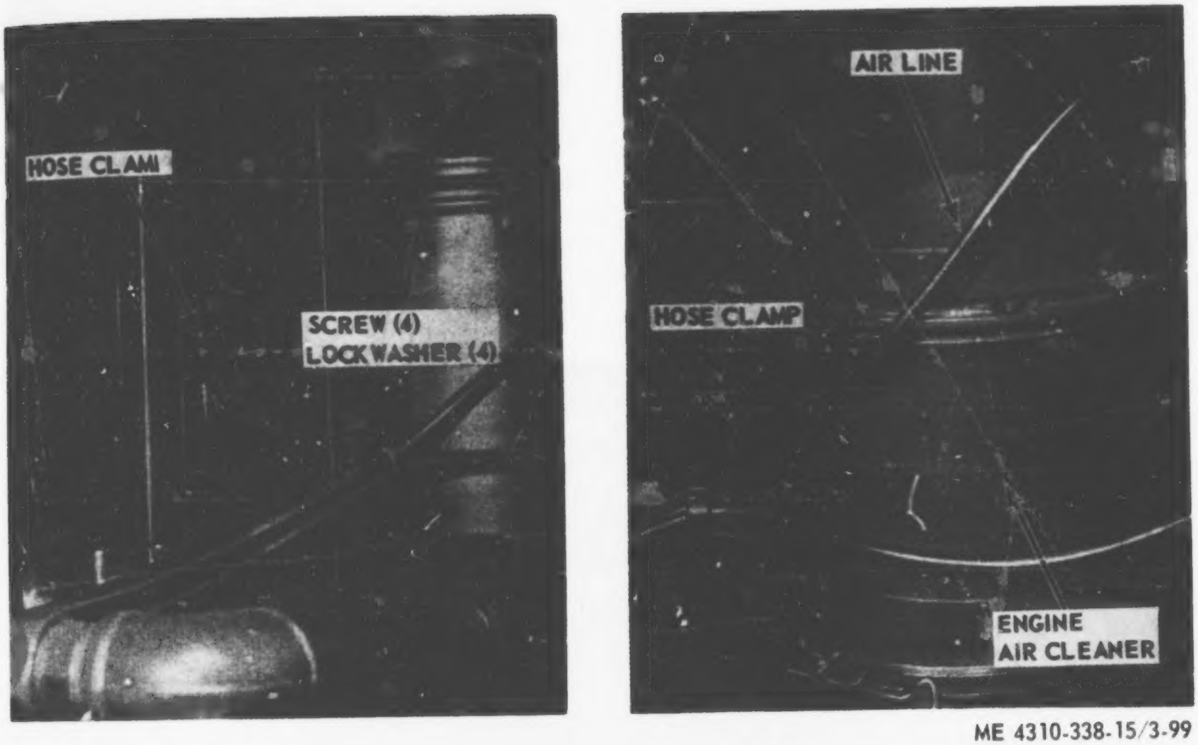
Section XVII. ENGINE INTAKE, EXHAUST, AND VALVE GROUP

3-112. General

This group consists of the turbocharger assembly, engine air cleaner assembly, exhaust manifold, glow plugs, valve cover, valves, and associated hoses, piping, and caps. The turbocharger, which is driven by the engine exhaust gases, draws ambient air in through the air cleaner, compresses the air, and directs it into the engine intake manifold. The gases from the turbocharger are exhausted through a pipe to atmosphere. The glow plugs preheat the air in the precombustion chambers to promote easier engine starting when the ambient temperature is below +60° F. The valves open and close to allow fuel and air into, or exhaust gases out of, each cylinder. The valve cover seals and protects the valves and mechanisms on top of the cylinder head.

3-113. Engine Air Cleaner Assembly

a. Removal. Remove engine air cleaner assembly and cap as shown in figure 3-99.



ME 4310-338-15/3-99

REMOVAL

STEP 1. DISCONNECT RESTRICTION INDICATOR AIR LINE.

STEP 2. LOOSEN HOSE CLAMP AND DISCONNECT INTAKE ELBOW FROM LOWER SECTION OF AIR CLEANER.

STEP 3. LOOSEN HOSE CLAMP AND DISCONNECT INTAKE HOSE FROM UPPER SECTION OF AIR CLEANER.

STEP 4. REMOVE SCREWS AND LOCKWASHERS. REMOVE AIR CLEANER.

INSTALLATION

STEP 1. POSITION AIR CLEANER AND SECURE WITH SCREWS AND LOCKWASHERS.

STEP 2. CONNECT INTAKE ELBOW TO LOWER SECTION OF AIR CLEANER AND SECURE WITH HOSE CLAMP.

STEP 3. CONNECT INTAKE HOSE TO UPPER SECTION OF AIR CLEANER AND SECURE WITH HOSE CLAMP.

STEP 4. CONNECT RESTRICTION INDICATOR AIR LINE.

Figure 3-99. Engine air cleaner assembly; removal and installation.

b. Disassembly, Cleaning, Inspection, and Reassembly. Disassemble, clean, inspect, and reassemble engine air cleaner assembly in the same manner described for the compressor air cleaner assembly (para 3-79).

c. Installation. Install engine air cleaner assembly as shown in figure 3-99.

3-114. Exhaust Pipe and Rain Shield

a. Removal. Remove exhaust pipe and rain shield as shown in figure 3-100.

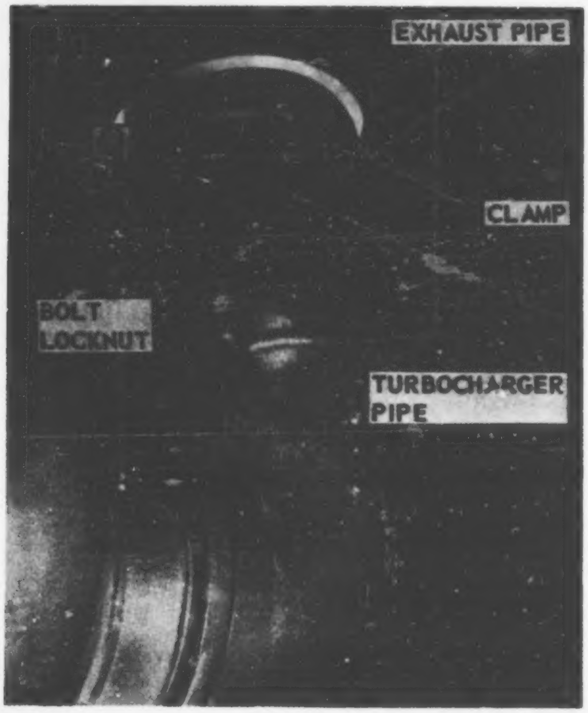
b. Installation. Install exhaust pipe and rain shiel as shown in figure 3-100.

3-115. Turbocharger Assembly

a. Removal.

(1) Remove exhaust pipe and rain shield (para 3-114).

(2) Remove turbocharger assembly by following numerical sequence shown in figure 3-101.



ME 4310-338-15/3-100

REMOVAL

STEP 1. REMOVE BOLT, LOCKNUT, AND CLAMP.

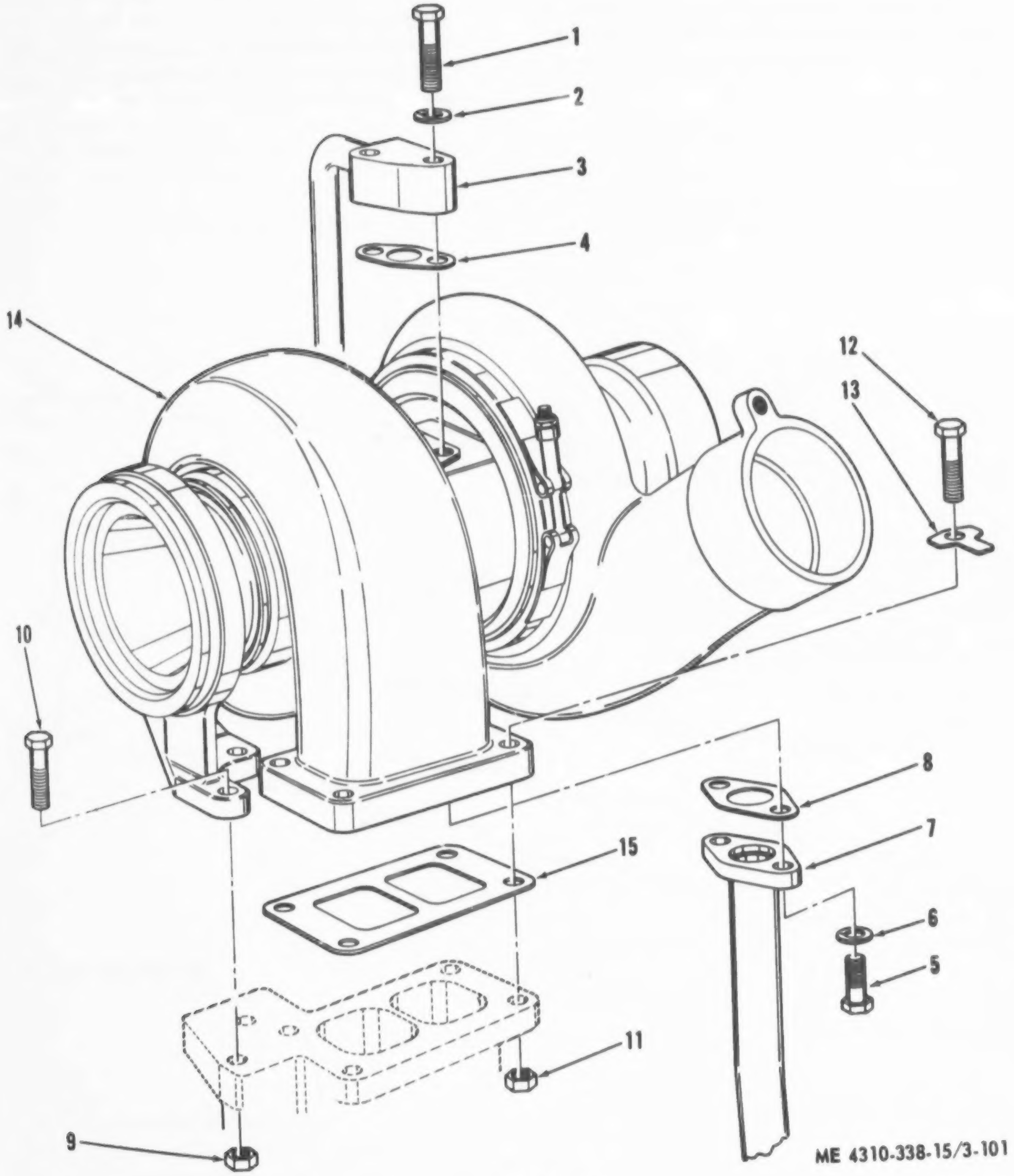
STEP 2. REMOVE EXHAUST PIPE AND RAIN SHIELD FROM TURBOCHARGER PIPE.

INSTALLATION

STEP 1. PLACE EXHAUST PIPE AND RAIN SHIELD ON TURBOCHARGER PIPE.

STEP 2. INSTALL CLAMP AND SECURE WITH BOLT AND LOCKNUT.

Figure 3-100. Exhaust pipe and rain shield; removal and installation.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ME 4310-338-15/3-101

1. Screw (2)
2. Lockwasher (2)
3. Tube assembly (ref)
4. Gasket
5. Screw (2)
6. Lockwasher (2)
7. Tube assembly (ref)
8. Gasket
9. Nut (2)
10. Bolt (2)
11. Nut (4)
12. Bolt (4)
13. Lock (4)
14. Turbocharger assembly
15. Gasket

Figure 3-101. Turbocharger assembly; removal and installation

b. Installation.

(1) Install turbocharger assembly by following reverse numerical sequence shown in figure 3-101.

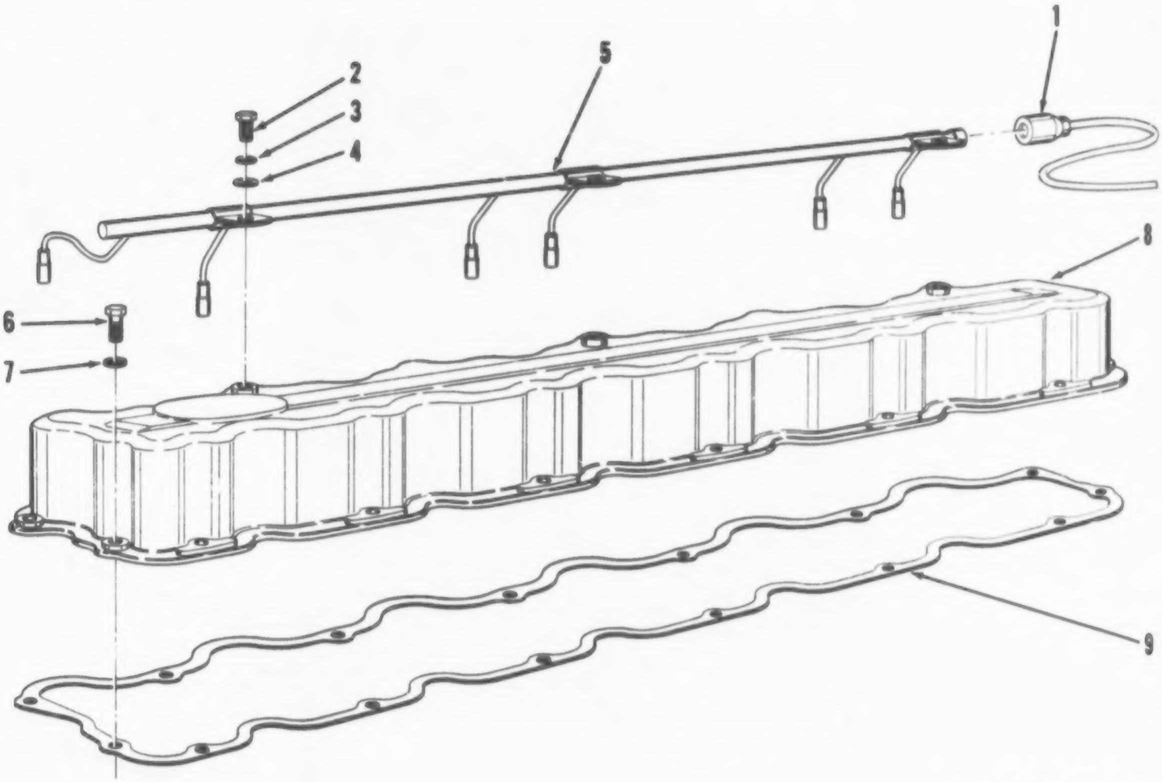
(2) Install exhaust pipe and rain shield (para 3-114).

3-116. Valve Cover

a. Removal.

(1) Remove turbocharger assembly (para 3-115).

(2) Remove valve cover by following numerical sequence shown in figure 3-102. Discard gasket.



1. Plug
2. Screw (3)
3. Lockwasher (3)
4. Flat washer (3)
5. Wire Assembly
6. Screw (15)
7. Lockwasher (15)
8. Valve cover
9. Gasket

Figure 3-102. Valve Cover; Removal and Installation.

b. Cleaning and Inspection.

(1) Clean valve cover using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry cover thoroughly.

(2) Inspect cover for cracks, breaks, distortion or any other defect.

(3) Inspect attaching hardware for damaged threads, cracks, distortion, or any other defect.

c. Installation.

(1) Install valve cover by following reverse numerical sequence shown in figure 3-102. Install a new gasket.

(2) Install turbocharger assembly (para 3-115).

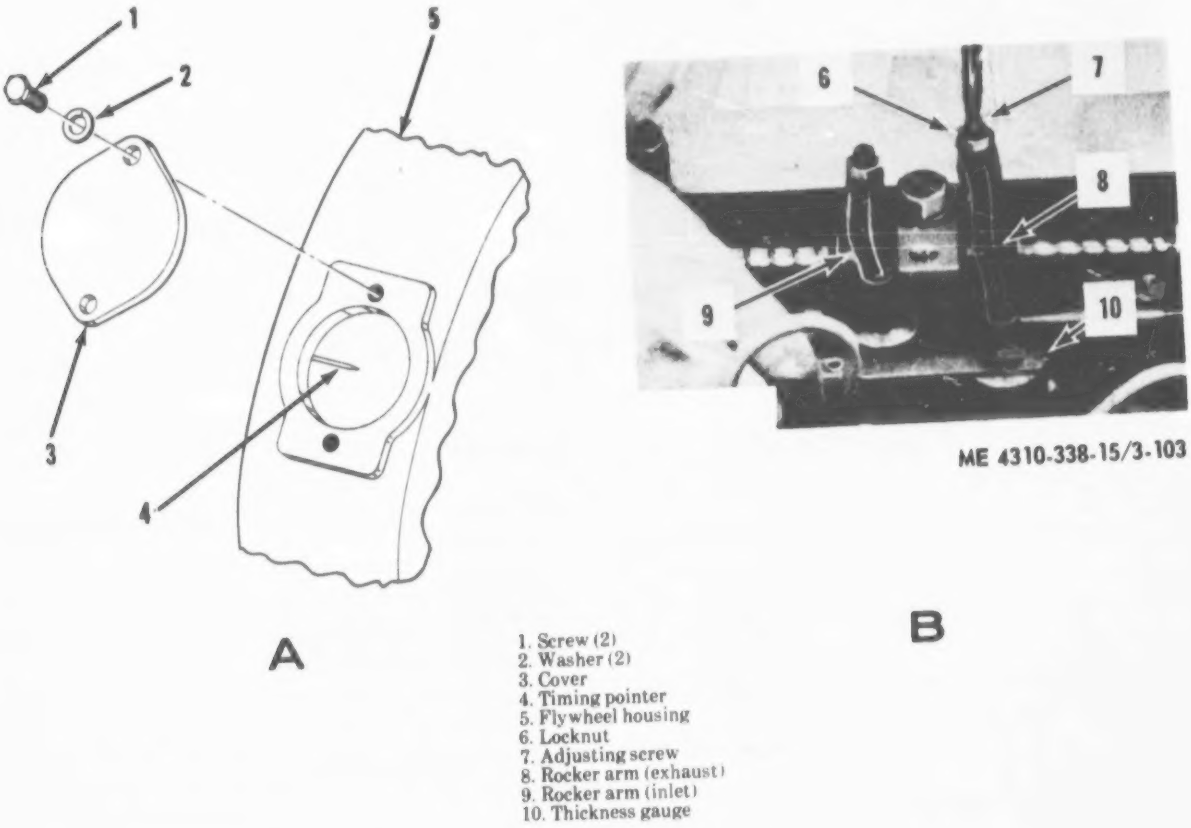
3-117. Intake and Exhaust Valve Adjustment

NOTE

Valve adjustment must be made when engine is cold and not running.

a. Remove valve cover (para 3-116).

b. Remove timing pointer cover from flywheel housing as shown in figure 3-103.



ME 4310-338-15/3-103

1. Screw (2)
2. Washer (2)
3. Cover
4. Timing pointer
5. Flywheel housing
6. Locknut
7. Adjusting screw
8. Rocker arm (exhaust)
9. Rocker arm (inlet)
10. Thickness gauge

Figure 3-103. Adjusting valve clearance.

c. Rotate crankshaft counterclockwise (as viewed from flywheel end) at least 60°. Continue rotating crankshaft counterclockwise until TC1-6 CYL mark on flywheel is aligned with timing pointer and both the inlet and exhaust valves of cylinder No. 1 are closed.

d, Adjust valves as shown in figure 3-103 and as follows:

(1) Adjust inlet valve clearances for cylinders No. 1, 2 and 4 and exhaust valve clearances for cylinders No. 1, 3 and 5.

(2) Loosen each locknut. Adjust screw and set each inlet valve clearance to 0.015" and each exhaust valve clearance to 0.025".

(3) Tighten each locknut and recheck clearance settings.

e. Rotate crankshaft counterclockwise until TC1-6 CYL mark on flywheel is again aligned with timing pointer but inlet and exhaust valves of cylinder No. 6 are both closed.

f. Adjust valves as shown in figure 3-103 and as follows:

(1) Adjust inlet valve clearances for cylinders No. 3, 5 and 6 and exhaust valve clearances for cylinders No. 2, 4 and 6.

(2) Loosen each locknut. Adjust screw and set each inlet valve clearance to 0.015" and each exhaust valve clearance to 0.025".

(3) Tighten each locknut and recheck clearance settings.

g. Install timing pointer cover on flywheel housing as shown in figure 3-103.

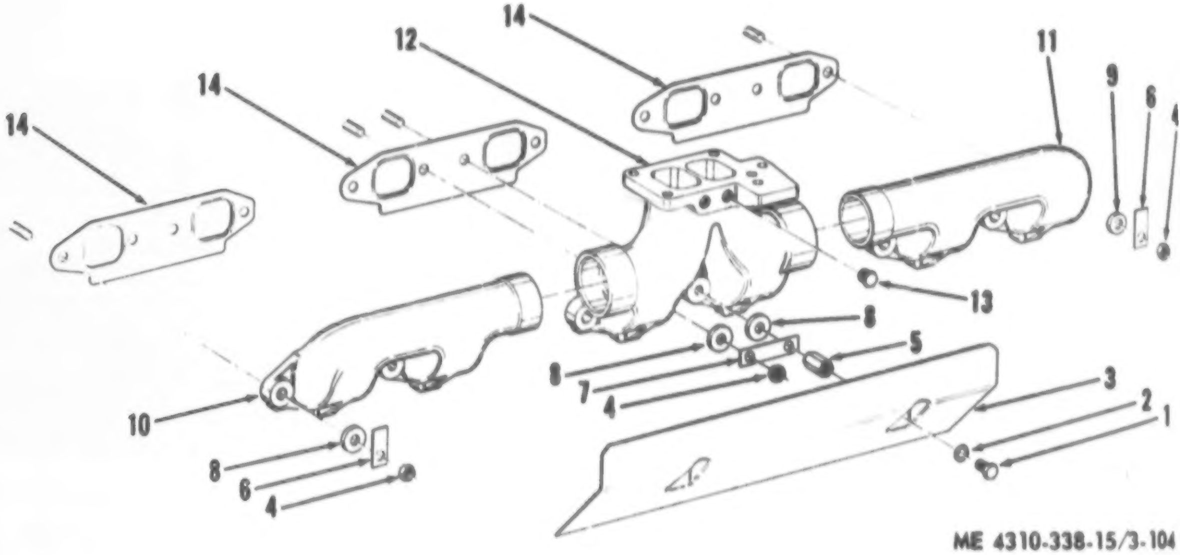
h. Install valve cover (para 3-116).

3-118. Exhaust Manifold

a. Removal.

(1) Remove turbocharger assembly (para 3-11

(2) Remove exhaust manifold as shown in figu 3-104.



ME 4310-338-15/3-104

1. Screw (2)
2. Washer (2)
3. Shield
4. Nut (10)
5. Nut (2)
6. Lock (10)
7. Lock (2)
8. Washer (11)
9. Washer
10. Manifold — rear section
11. Manifold — front section
12. Manifold — center section
13. Plug (2)
14. Gasket (3)

Figure 3-104. Exhaust manifold; removal and installation.

b. Cleaning and Inspection.

(1) Clean parts using a wire brush and scrape to remove all scale deposits. Clean parts using a cleaning solvent that is in accordance with Federal specification P-D-680.

(2) Inspect parts for cracks, breaks, distortion, or any other defect.

(3) Inspect attaching hardware for damaged threads, cracks, distortion, or any other defect.

c. Installation.

(1) Install exhaust manifold as shown in figure 3-104.

(2) Install turbocharger assembly (para 3-115).

3-119. Glow Plugs

a. Removal. Remove glow plugs as shown in figure 3-105.

b. Cleaning and Inspection.

(1) Clean glow plugs using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry plugs thoroughly.

(2) Inspect glow plugs for cracks, breaks, distortion, or any other defect. Inspect for damaged threads.

(3) Inspect wiring connection at top of glow plugs for cracks, corrosion, or any other defect.

c. Installation. Install glow plugs as shown in figure 3-105.

d. Testing. The following procedure provides a way for isolating a faulty glow plug.

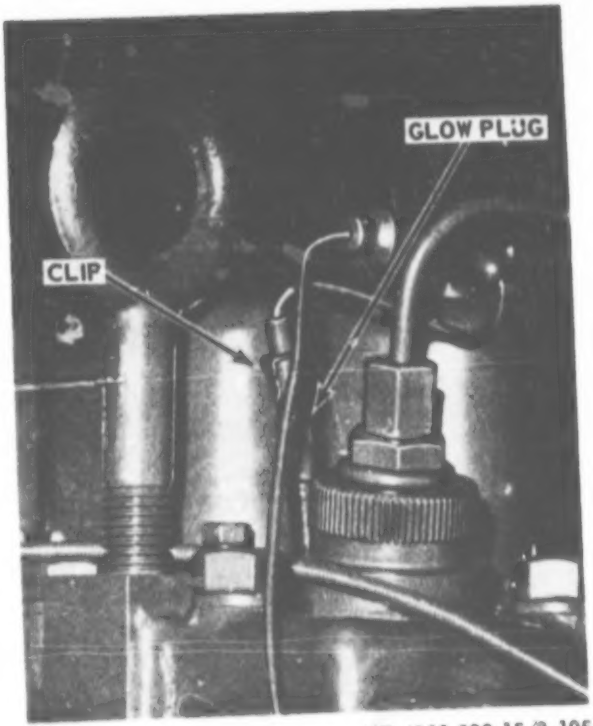
(1) Connect an ammeter as shown in figure 3-106.

(2) Place HEAT-START switch in HEAT position. Observe reading on ammeter.

(3) Hold switch in HEAT position; disconnect, then reconnect wire on each glow plug, one at a time. A good glow plug will cause the ammeter to fluxuate when the wire is removed and reconnected. The ammeter will fluxuate very little or not at all if glow plug is defective.

NOTE

Each glow plug draws approximately five to seven amperes when energized.



ME 4310-338-15/3-105

REMOVAL

STEP 1. DISCONNECT CLIP FROM TOP OF GLOW PLUG.

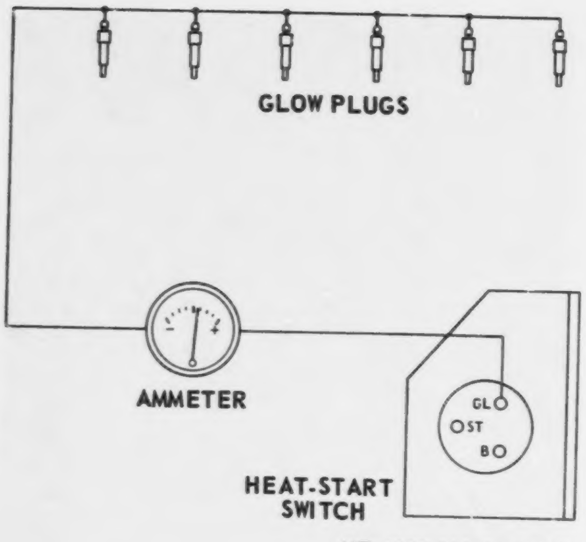
STEP 2. UNSCREW AND REMOVE GLOW PLUG.

INSTALLATION

STEP 1. INSTALL GLOW PLUG. TIGHTEN TO A TORQUE VALUE OF 96 TO 144 FOOT-POUNDS.

STEP 2. CONNECT CLIP TO TOP OF GLOW PLUG.

Figure 3-105. Glow plugs; removal and installation.



ME 4310-338-15/3-106

Figure 3-106. Glow plug test setup.

Section XVIII. WHEEL AND BRAKE GROUP

3-120. General

The wheel and brake group consists of size 9:00x20 pneumatic tires, 20-inch wheels, wedge-actuated service air brakes, spring-actuated mechanical parking brakes, service chambers, an emergency relay valve, and an air reservoir tank. A hand lever and actuating mechanism is provided to manually operate the parking brakes. The service brakes are operated by air from the towing vehicle via a service air line and an emergency air line. During normal operation, air from the towing vehicle is channeled through the emergency relay valve to the service chamber on each wheel. The service chambers actuate the wedge brakes. Should the intervehicular air lines break away, the emergency relay valve channels air from the reservoir tank to the service chambers and the brakes on all four wheels will engage. This air will bleed off in approximately 20 minutes and the vehicle can then be moved.

3-121. Wheels, Tires, and Tubes

NOTE

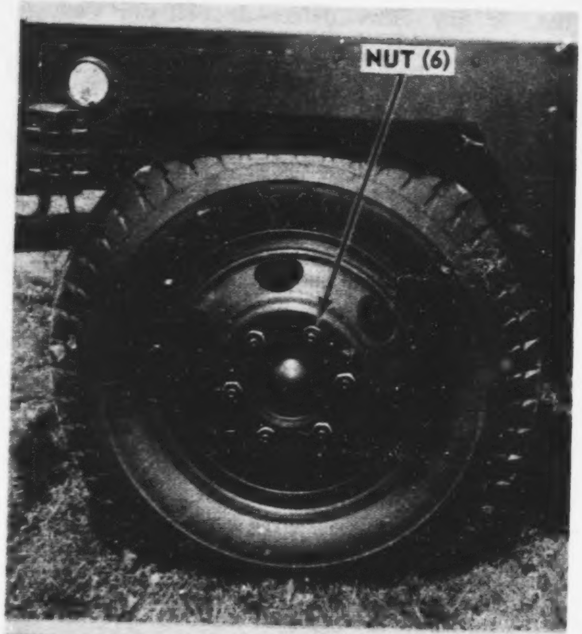
Refer to TM 9-1870-1 for care and maintenance of pneumatic tires.

a. Removal. Remove wheel assembly as shown in figure 3-107.

WARNING

Be sure all air is removed from tire before attempting to disassemble wheel.

b. Disassembly. Disassemble tube, tire, and wheel as shown in figure 3-108.



ME 4310-338-15/3-107

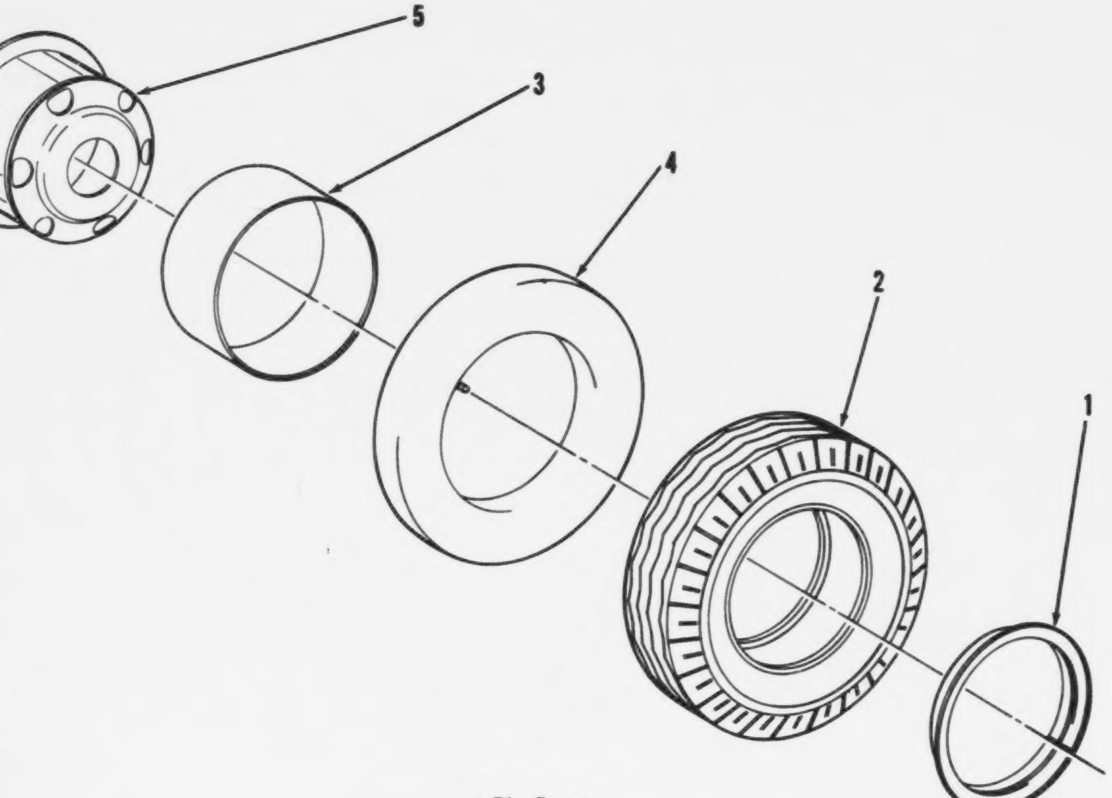
REMOVAL

REMOVE NUTS AND REMOVE WHEEL.

INSTALLATION

POSITION WHEEL AND INSTALL NUTS.

Figure 3-107. Wheel assembly; removal and installation.



1. Rim flange
2. Tire
3. Flap
4. Inner tube
5. Rim

ME 4310-338-15/3-108

Figure 3-108. Wheel assembly; disassembly and reassembly.

best copy available

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect all metal parts for cracks, breaks, distortion, or any other defect.

(3) Inflate inner tubes and submerge them in water to detect presence of leaks. Leaks will show up as air bubbles in the water.

(4) Inspect tires for cuts, holes, and excessive or uneven tread wear. Inspect side walls for radial cracks.

(5) Inspect mounting hardware for damaged threads, cracks, distortion, or any other defect.

d. Reassembly. Reassemble tube, tire, and wheel as shown in figure 3-108. Inflate each tire to 45 PSI.

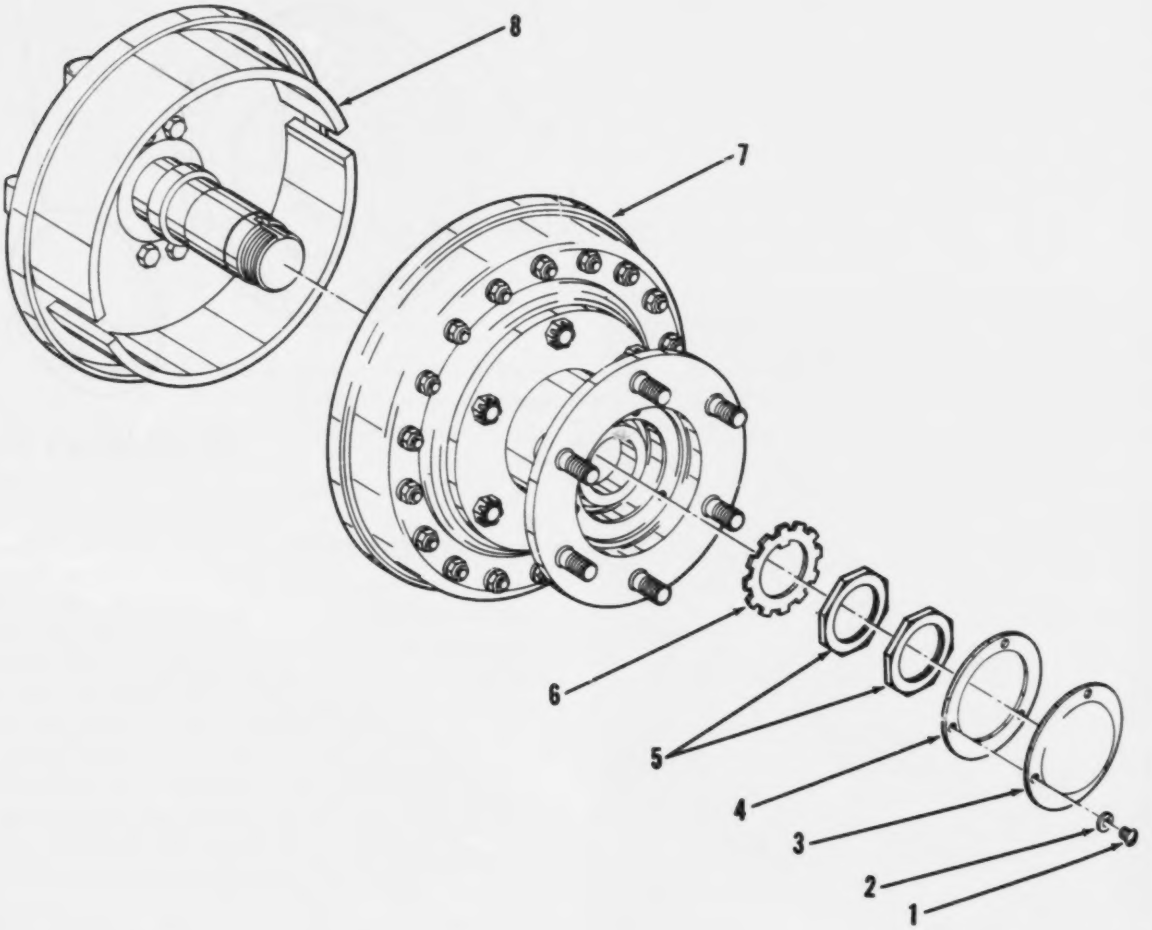
e. Installation. Install wheel assembly as shown in figure 3-107.

3-122. Hub and Brake Drum Assemblies

a. Removal.

(1) Remove wheel (para 3-121).

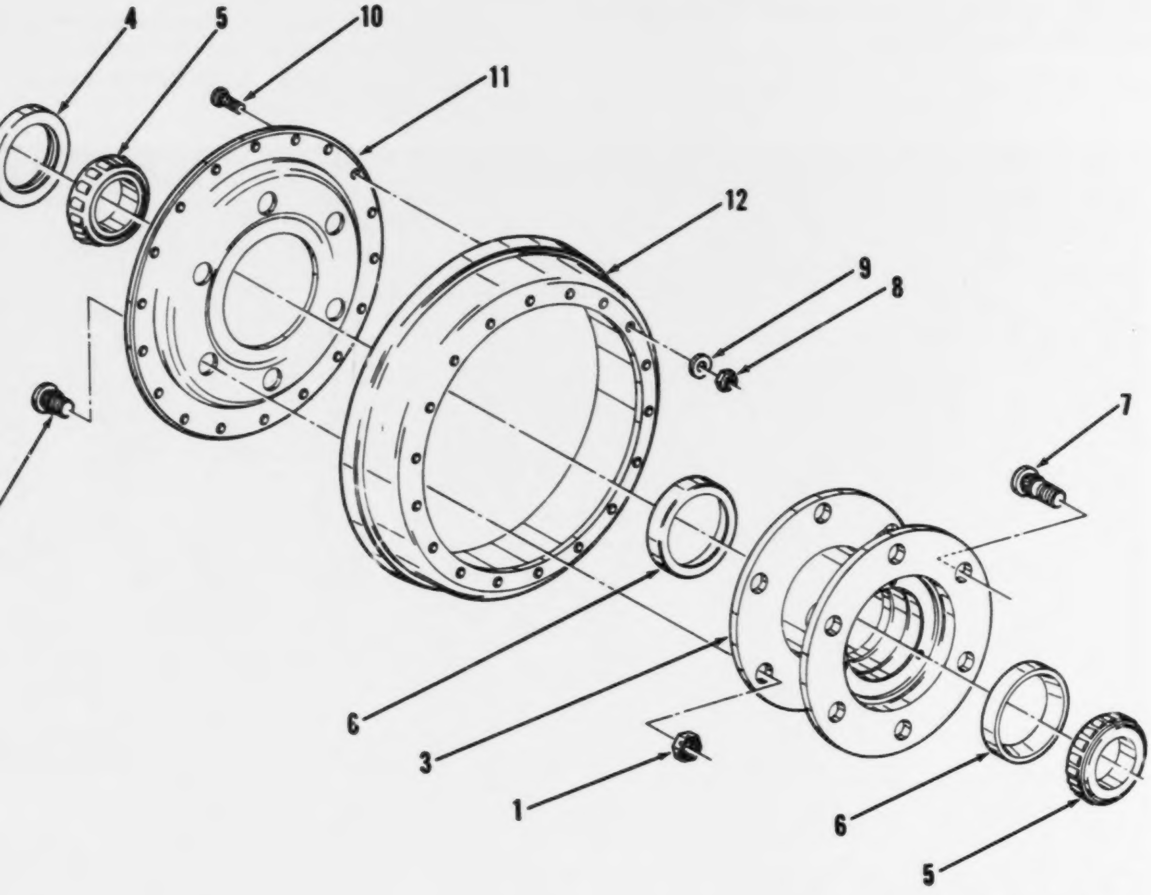
(2) With unit on jacks, remove hub and brake drum assembly as shown in figure 3-109.



1. Screw (3)
2. Lockwasher (3)
3. Cover
4. Gasket
5. Nut (2)
6. Lock
7. Hub and brake drum assembly
8. Wedge brake assembly and axle (ref)

Figure 3-109. Hub and brake drum assembly; removal and installation.

Disassembly. Disassemble hub and brake drum mbly in numerical sequence shown in figure 0.



ME 4310-338-15/3-110

1. Nut (6)
2. Bolt (6)
3. Hub
4. Seal
5. Bearing cone (2)
6. Bearing cup (2)
7. Bolt (6)
8. Nut (18)
9. Washer (18)
10. Bolt (18)
11. Adapter
12. Brake drum

Figure 3-110. Hub and brake drum assembly; disassembly and reassembly.

Cleaning and Inspection.

(1) Clean all metal parts using a cleaning solvent t is in accordance with Federal specification 0-680. Dry parts thoroughly. Discard all gaskets l seal.

(2) Inspect bearings, cones, and caps for cracks, aks, distortion, excessive wear, or any other ect.

(3) Inspect inside diameter surface of brake drum scoring or any other defect. If drum is scored, n drum on lathe to just remove scoring.

(4) Inspect all other parts for excessive wear, damage, distortion, or any other defect.

(5) Inspect attaching hardware for damaged threads, distortion, cracks, or any other defect.

d. Reassembly. Reassemble hub and brake drum assembly in reverse numerical sequence shown in figure 3-110. Install new gaskets and seal. Lubricate wheel bearing cones in accordance with Lubrication Order (LO) 5-4310-338-12.

e. Installation.

(1) With unit on jacks, install hub and brake drum

assembly as shown in figure 3-109.

(2) Install wheel (para 3-121).

3-123. Spring Brake-Service Chamber Assembly (Rear Wheels)

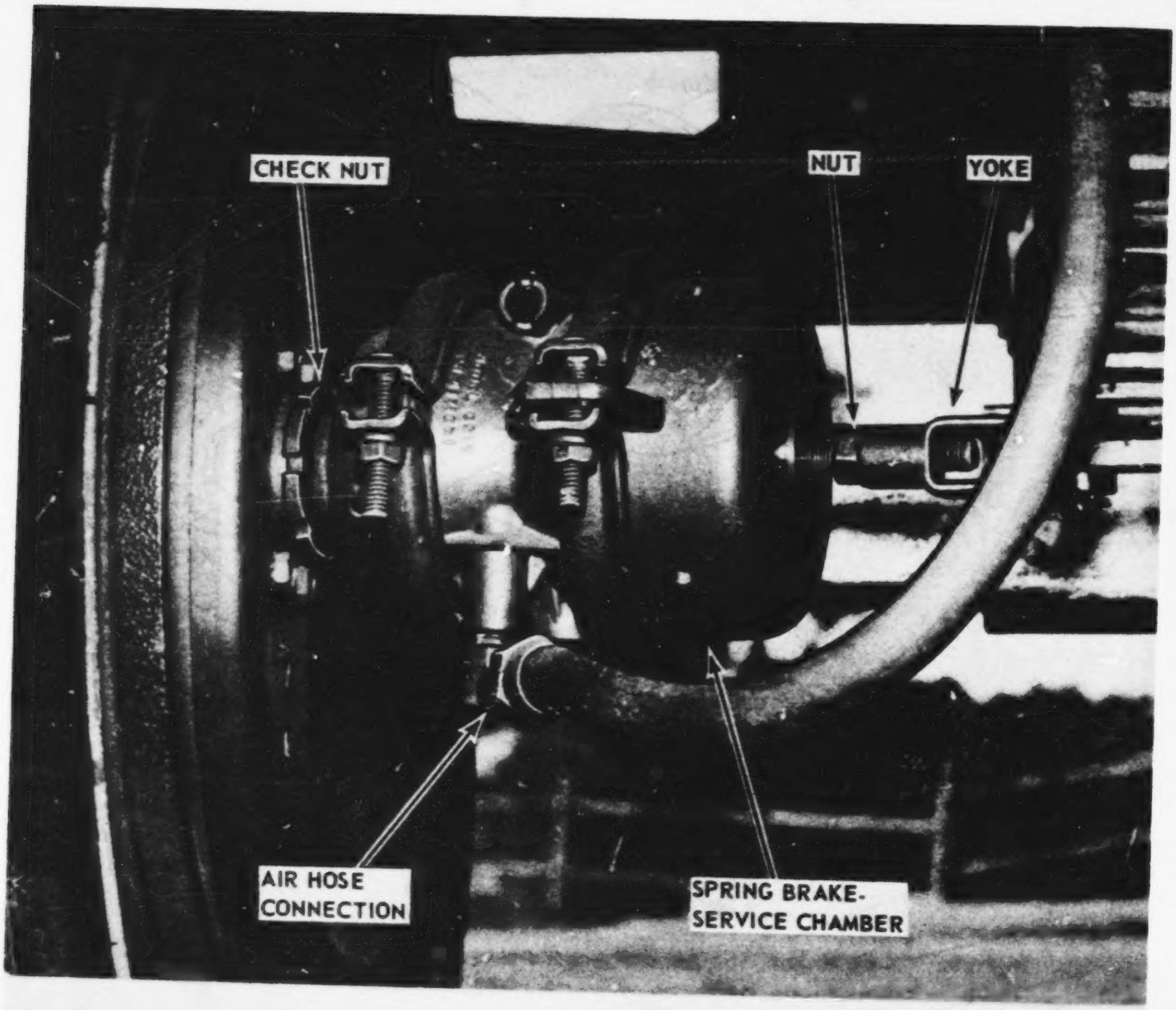
a. Removal.

(1) Place parking brake lever in up (brakes disengaged) position.

(2) Turn nut on release stud down against brake chamber so that compression spring will be held in the caged position.

(3) Disconnect air line. Disconnect parking brake lever linkage as shown in figure 3-118.

(4) Remove spring brake-service chamber assembly as shown in figure 3-111.



ME 4310-338-15/3-111

REMOVAL

STEP 1. DISCONNECT AIR HOSE AND YOKE PIN.

STEP 2. LOOSEN AND BACK OFF CHECK NUT.

STEP 3. UNSCREW AND REMOVE SPRING BRAKE-SERVICE CHAMBER.

INSTALLATION

STEP 1. SCREW SPRING BRAKE-SERVICE CHAMBER INTO BRAKE ACTUATOR UNTIL TUBE IS TIGHT AGAINST WEDGE STOP WASHER.

STEP 2. TIGHTEN CHECK NUT.

STEP 3. CONNECT AIR HOSE AND YOKE PIN.

Figure 3-111. Spring brake-service chamber assembly; removal and installation.

b. *Installation.*

(1) Install spring brake-service chamber assem- y as shown in figure 3-111.

NOTE

Be sure compression spring is caged before installing spring brake-air chamber assembly. See step 2 under removal instructions, above.

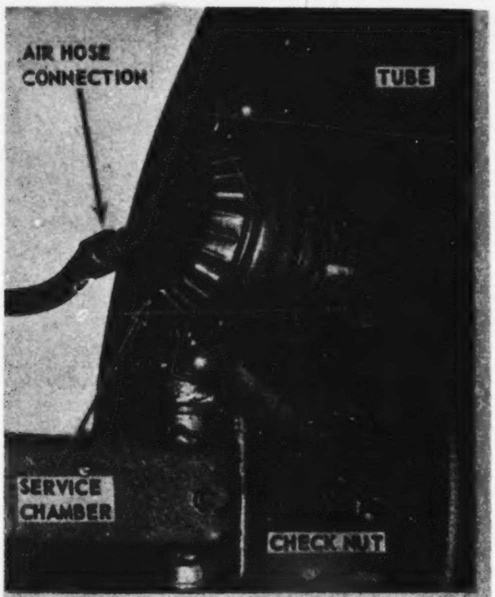
(2) Connect air line. Connect parking brake lever kage as shown in figure 3-118.

(3) With parking brake lever in up position, turn t on release stud tight against clevis.

(4) Adjust parking brake linkage (fig. 3-119).

124. Service Chamber Assemblies (Front heels)

a. *Removal.* Remove each service chamber as own in figure 3-112.



ME 4310-338-15/3-112

REMOVAL

STEP 1. REMOVE AIR HOSE CONNECTION.

STEP 2. LOOSEN AND BACK OFF CHECK NUT.

STEP 3. UNSCREW AND REMOVE SERVICE CHAMBER.

INSTALLATION

STEP 1. SCREW SERVICE CHAMBER INTO BRAKE ACTUATOR UNTIL TUBE IS TIGHT AGAINST WEDGE STOP WASHER.

STEP 2. TIGHTEN CHECK NUT.

STEP 3. INSTALL AIR HOSE CONNECTION.

Figure 3-112. Service chamber assembly; removal and installation

b. *Installation.* Install each service chamber as shown in figure 3-112.

3-125. Wedge Brake Assemblies

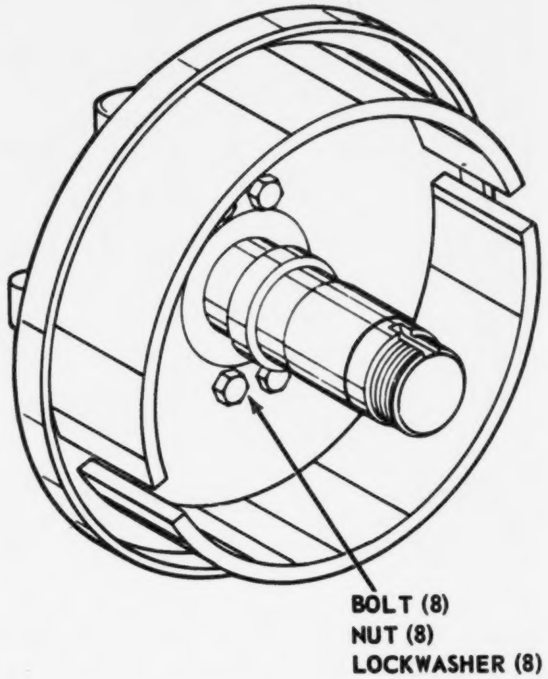
a. *Removal.*

(1) Remove wheel (para 3-121).

(2) Remove hub and brake drum assembly (para 3-122).

(3) Remove service chamber assembly (para 3-124) or spring brake-service chamber assembly (para 3-123) as applicable.

(4) Remove wedge brake assembly as shown in figure 3-113.



ME 4310-338-15/3-113

REMOVAL

REMOVE BOLTS, NUTS, AND LOCKWASHERS. REMOVE WEDGE BRAKE ASSEMBLY.

INSTALLATION

PLACE WEDGE BRAKE ASSEMBLY IN MOUNTING POSITION AND SECURE WITH BOLTS, NUTS, AND LOCKWASHERS.

Figure 3-113. Wedge brake assembly; removal and installation.

b. *Installation.*

(1) Insstall wedge brake assembly as shown in figure 3-113.

(3) Install service chamber assembly (para 3-124) or spring brake-service chamber assembly (para 3-123) as applicable.

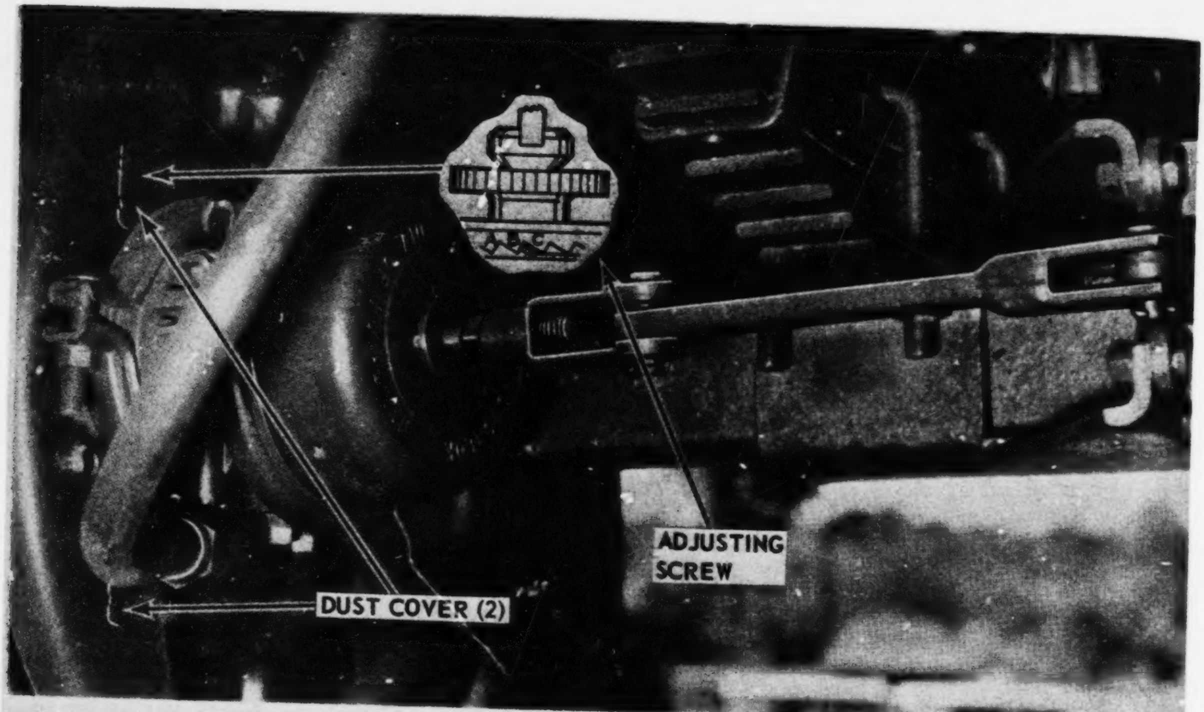
(3) Install hub and brake drum assembly (para 3-122).

(4) Install wheel (para 3-121).

c. *Adjustment.* The rear sheel brake shoes require adjustment periodically to compensate for normal lining wear. Adjustment must also be made following replacement of the wedge brake assemblies or to eliminate brake chatter. The front wheel brakes adjust automatically and should not require manual adjustment. Adjust rear wheel brakes as shown in figure 3-114.

NOTE

Do not adjust brake shoes when brake drums are hot.



ME 4310-338-15/3-114

STEP 1. RELEASE PARKING BRAKES. JACK UP UNIT UNTIL WHEEL JUST CLEARS GROUND.

STEP 2. REMOVE DUST COVERS.

STEP 3. TURN ONE ADJUSTING SCREW UNTIL SHOE DRAGS SLIGHTLY ON BRAKE DRUM WHEN WHEEL IS TURNED BY HAND. BACK OFF ADJUSTING SCREW JUST ENOUGH TO ALLOW WHEEL TO ROTATE FREELY.

STEP 4. REPEAT STEP 3, ABOVE, FOR OTHER ADJUSTING SCREW AND BRAKE SHOE. MAKE BOTH SHOE ADJUSTMENTS AS UNIFORM AS POSSIBLE.

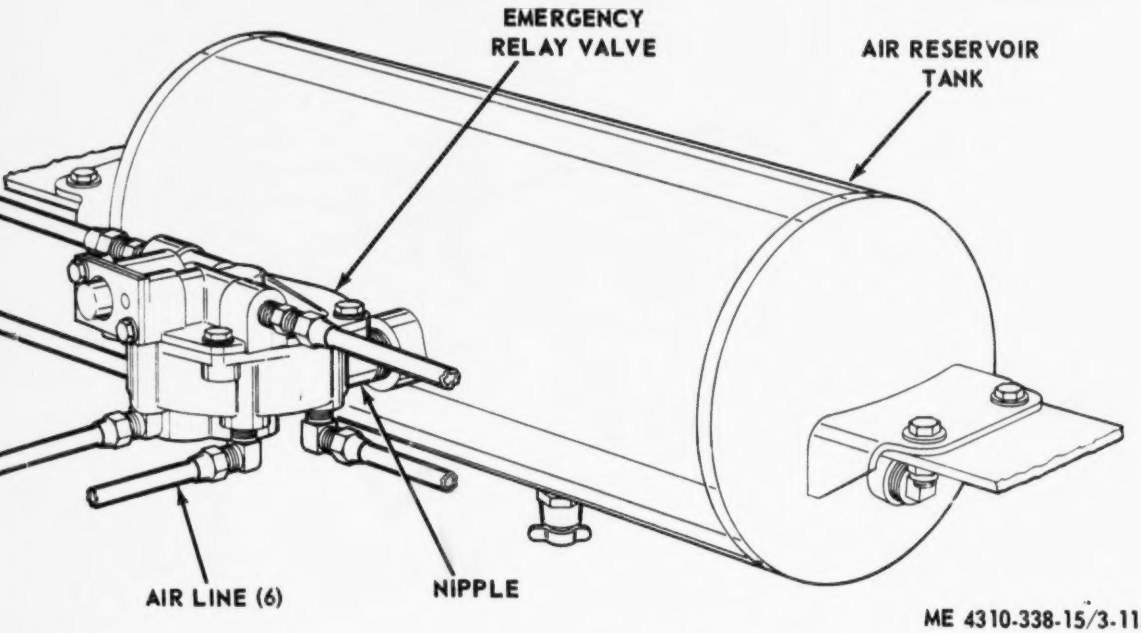
STEP 5. INSTALL DUST COVERS.

STEP 6. REMOVE JACK AND ENGAGE PARKING BRAKES.

Figure 3-114. Wedge brake assembly adjustment.

26. Emergency Relay Valve

Removal. Remove emergency relay valve as wn in figure 3-115.


EMERGENCY RELAY VALVE
AIR RESERVOIR TANK
AIR LINE (6)
NIPPLE

ME 4310-338-15/3-115

MOVAL

EP 1. DISCONNECT AIR LINES FROM EMERGENCY RELAY VALVE.

EP 2. UNSCREW AND REMOVE EMERGENCY RELAY VALVE FROM AIR RESERVOIR TANK. LEAVE NIPPLE IN TANK.

INSTALLATION

STEP 1. INSTALL EMERGENCY RELAY VALVE TO NIPPLE ON AIR RESERVOIR TANK.

STEP 2. CONNECT AIR LINES TO EMERGENCY RELAY VALVE.

Figure 3-115. Emergency relay valve; removal and installation.

b. Installation. Install emergency relay valve as shown in figure 3-115.

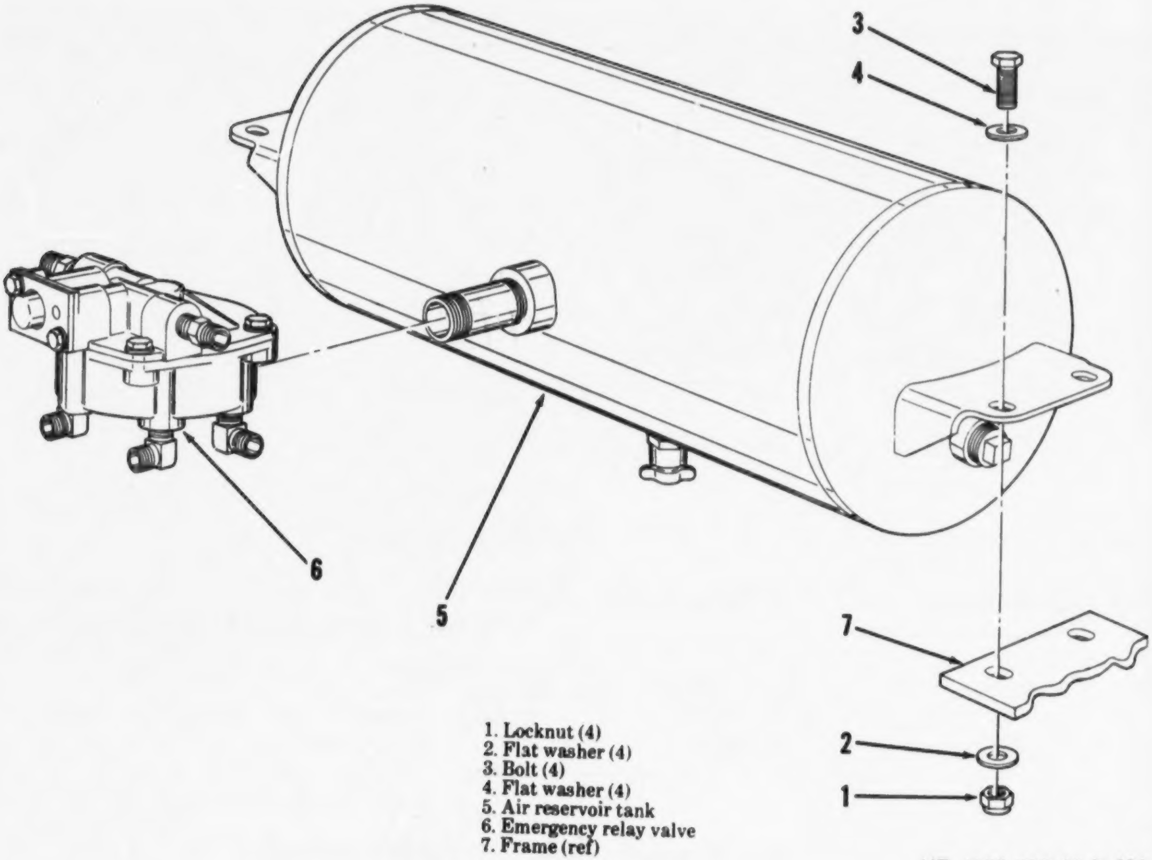
3-127. Air Reservoir Tank

a. Removal.

(1) Remove all air lines from emergency relay valve (fig. 3-117).

(2) Remove air reservoir tank by following numerical sequence shown in figure 3-116.

(3) Remove emergency relay valve from air reservoir tank.



1. Locknut (4)
2. Flat washer (4)
3. Bolt (4)
4. Flat washer (4)
5. Air reservoir tank
6. Emergency relay valve
7. Frame (ref)

ME 4310-338-15/3-116

Figure 3-116. Air reservoir tank; removal and installation.

b. Installation.

(1) Install emergency relay valve on air reservoir tank.

(2) Install air reservoir tank by following reverse numerical sequence shown in figure 3-116.

(3) Install all air lines on emergency relay valve (fig. 3-117).

3-128. Brake Air Lines, Fittings, and Couplings

a. Removal. Remove brake air lines, fittings, and couplings by following numerical sequence shown in figure 3-117.

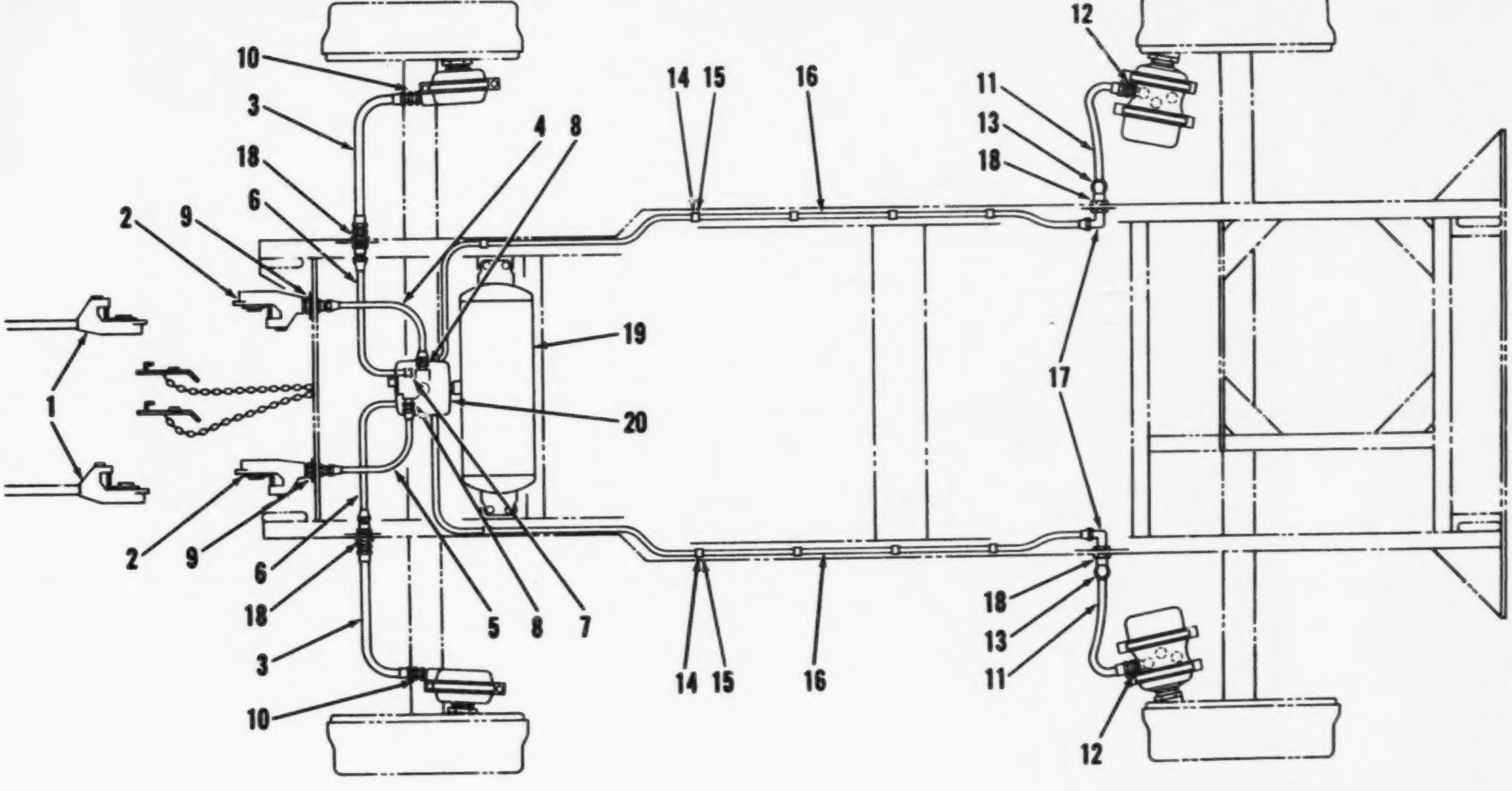
b. Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect lines for cracks, kinks, distortion, or any other defect.

(3) Inspect fittings and couplings for cracks, breaks, damaged threads, or any other defect.

c. Installation. Install brake air lines, fittings, and couplings by following reverse numerical sequence shown in figure 3-117.


10
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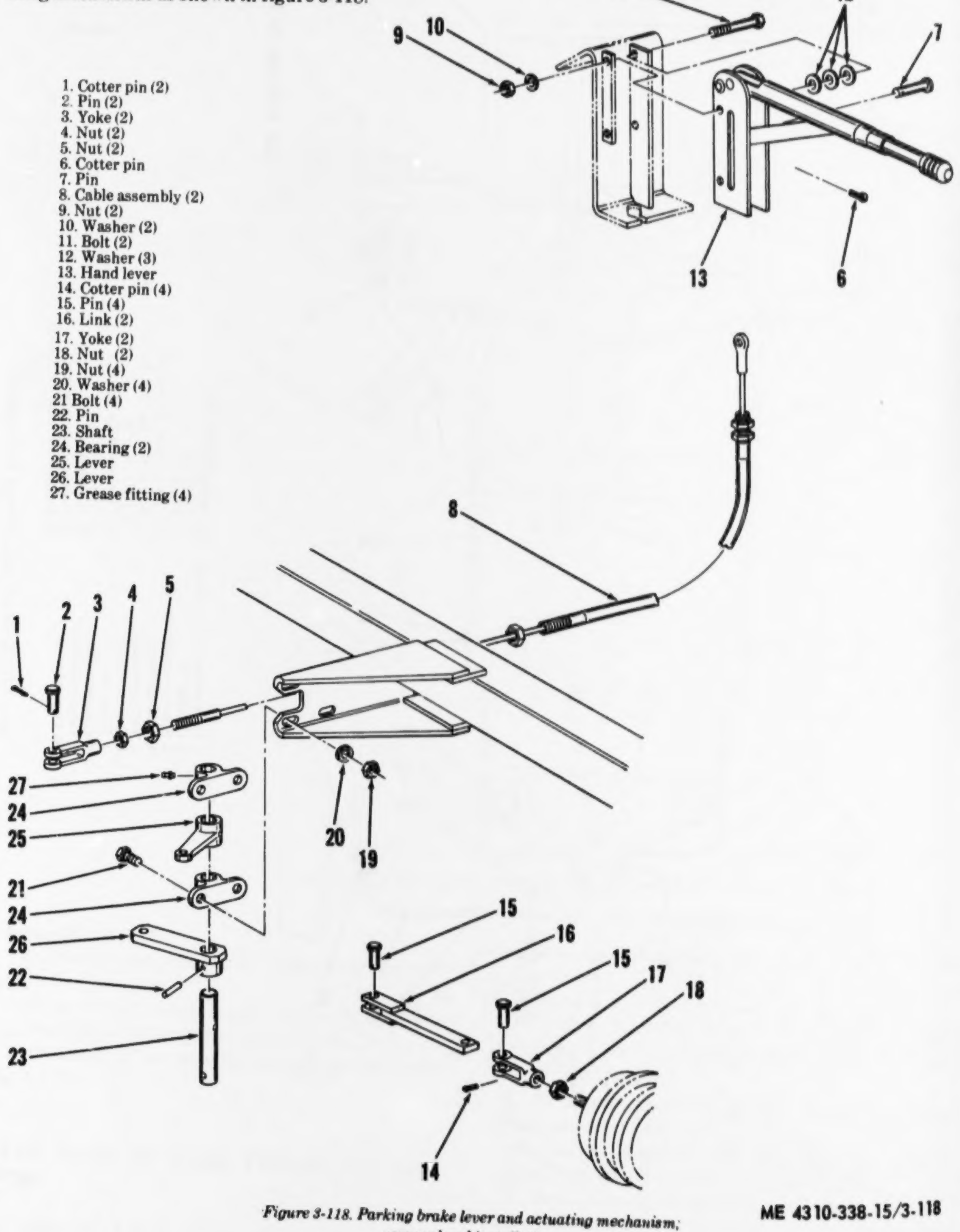
ME 4310-338-15/3-117

1. Intervehicular air line (2)
2. Coupler (2)
3. Hose assembly (2)
4. Tube assembly
5. Tube assembly
6. Tube assembly
7. Elbow (4)
8. Connector (2)
9. Connector (2)
10. Connector (2)
11. Hose assembly (2)
12. Elbow (2)
13. Elbow (2)
14. Clamp, tube, 3/8 in. (10)
15. Screw, self-tapping, No. 6 x 3/8 in. (10)
16. Tube assembly (2)
17. Elbow (2)
18. Connector (4)
19. Air reservoir tank (ref)
20. Emergency relay valve (ref)

Figure 3-117. Brake Air Lines, Fittings, and Couplings; Removal and Installation.

3-129. Parking Brake Lever and Actuating Mechanism

a. Removal. Remove parking brake lever and actuating mechanism as shown in figure 3-118.



1. Cotter pin (2)
2. Pin (2)
3. Yoke (2)
4. Nut (2)
5. Nut (2)
6. Cotter pin
7. Pin
8. Cable assembly (2)
9. Nut (2)
10. Washer (2)
11. Bolt (2)
12. Washer (3)
13. Hand lever
14. Cotter pin (4)
15. Pin (4)
16. Link (2)
17. Yoke (2)
18. Nut (2)
19. Nut (4)
20. Washer (4)
21. Bolt (4)
22. Pin
23. Shaft
24. Bearing (2)
25. Lever
26. Lever
27. Grease fitting (4)

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ME 4310-338-15/3-118

Figure 3-118. Parking brake lever and actuating mechanism; removal and installation.

Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that
 accordance with Federal specification P-D-680.
parts thoroughly.

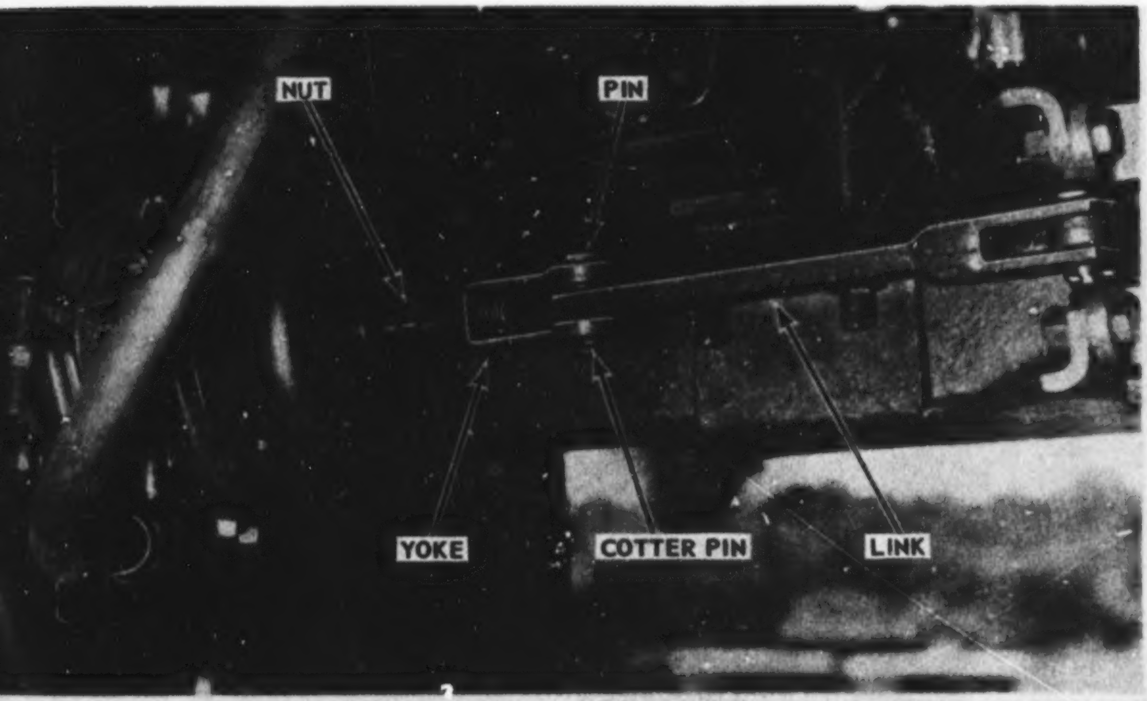
(2) Inspect cables and handle for cracks, kinks,
ortion, or any other defect.

(3) Inspect yokes and links for distortion, cracks, breaks, or any other defect.

(4) Inspect all other parts for damaged threads, distortion, breaks, or any other defect.

c. Installation. Install parking brake lever and actuating mechanism as shown in figure 3-118.

d. Adjustment. Adjust parking brake as shown in figure 3-119.



ME 4310-338-15/3-119

P 1. BLOCK FRONT WHEELS. JACK UP UNIT UNTIL REAR WHEELS ARE OFF GROUND.

P 2. ENGAGE PARKING BRAKES. TURN NUT AGAINST HOUSING.

P 3. REMOVE PIN AND COTTER PIN. SWING LINK AWAY FROM YOKE.

P 4. TURN NUT AGAINST HOUSING TO DRAW RELEASE STUD OUT AND CAGE SPRING. ADJUST NUT UNTIL BRAKES JUST STOP DRAGGING AND WHEEL TURNS FREELY.

STEP 5. PLACE PARKING BRAKE HANDLE IN UP (DISENGAGED) POSITION. ADJUST YOKE TO MATCH HOLES WITH HOLE IN LINK. INSTALL PIN AND COTTER PIN BUT DO NOT BEND COTTER PIN.

STEP 6. ENGAGE PARKING BRAKES AND CHECK WHEEL TO BE SURE BRAKES ARE LOCKED. READJUST, AS NECESSARY, FOLLOWING ABOVE PROCEDURE. BEND COTTER PIN.

STEP 7. RELEASE AND REMOVE JACK. REMOVE FRONT WHEEL BLOCKS.

Figure 3-119. Parking brake lever and actuating mechanism adjustment.

Section XIX. SUSPENSION AND STEERING COMPONENTS

3-130. General

The suspension and steering components include the springs and shackles, steering knuckles and spindles, tie rods, king pins, the center steering arm, the tow bar, and associated yokes and pins. The springs are fastened to the axle beams, then attached to the frame with shackles and pins. On the front axle, each steering knuckle and spindle pivots around a king pin and is connected to the center steering arm by a tie rod. The center steering arm also pivots around a king pin. The tow bar attaches to the center steering arm using a removable pin. The tow bar can be positioned vertically when not being used or placed in the horizontal position for towing the air compressor unit.

3-131. Springs

a. Removal.

(1) Remove wheel (para 3-121).

(2) With frame blocked up, remove spring as shown in figure 3-120.

b. Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect spring for cracks, breaks, separation, or any other defect.

(3) Inspect all attaching pins and hardware for cracks, breaks, damaged threads, distortion, or any other defect.

c. Installation.

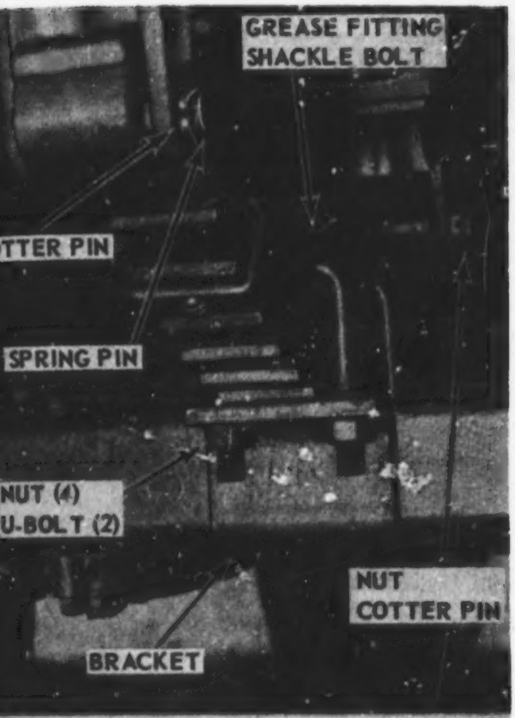
(1) Install spring as shown in figure 3-120.

(2) Install wheel (para 3-121).

(3) Lubricate spring in accordance with Lubrication Order (LO 5-4310-338-12.

3-132. Tow Bar

a. Removal. Remove tow bar as shown in figure 3-121.



ME 4310-338-15/3-120

OVAL

1. REMOVE COTTER PINS AND GREASE FITTING.

2. REMOVE NUT AND SHACKLE BOLT. REMOVE SPRING PIN.

3. REMOVE U-BOLTS, NUTS, AND BRACKET.

ALLATION

1. HOLD SPRING IN PLACE AND INSTALL SHACKLE BOLT AND NUT. INSTALL SPRING PIN.

2. INSTALL COTTER PINS AND GREASE FITTING.

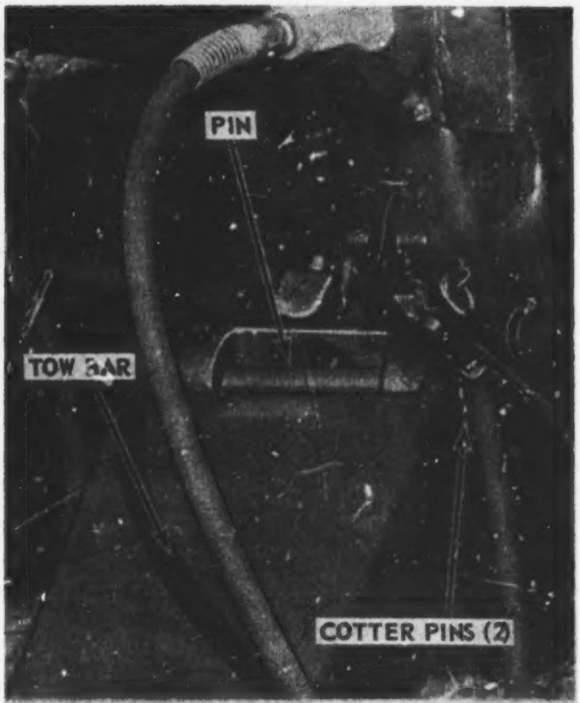
3. INSTALL BRACKET, U-BOLTS, AND NUTS.

Figure 3-120. Springs; removal and installation.

Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that accordance with Federal specification P-D-680.

(2) Inspect pin for cracks, breaks, distortion, ny other defect.



ME 4310-338-15/3-121

REMOVAL

STEP 1. REMOVE COTTER PINS.

STEP 2. REMOVE PIN FROM TOW BAR. REMOVE TOW BAR.

INSTALLATION

STEP 1. PLACE TOW BAR IN MOUNTING POSITION AND INSTALL PIN.

STEP 2. INSTALL COTTER PINS.

Figure 3-121. Tow bar; removal and installation.

(3) Inspect safety chains for broken links, cracks, distortion, or any other defect.

(4) Inspect tow bar for cracks, breaks, distortion, or any other defect.

c. Installation. Install tow bar as shown in figure 3-121. Lubricate in accordance with Lubrication Order (LO) 5-4310-338-12.

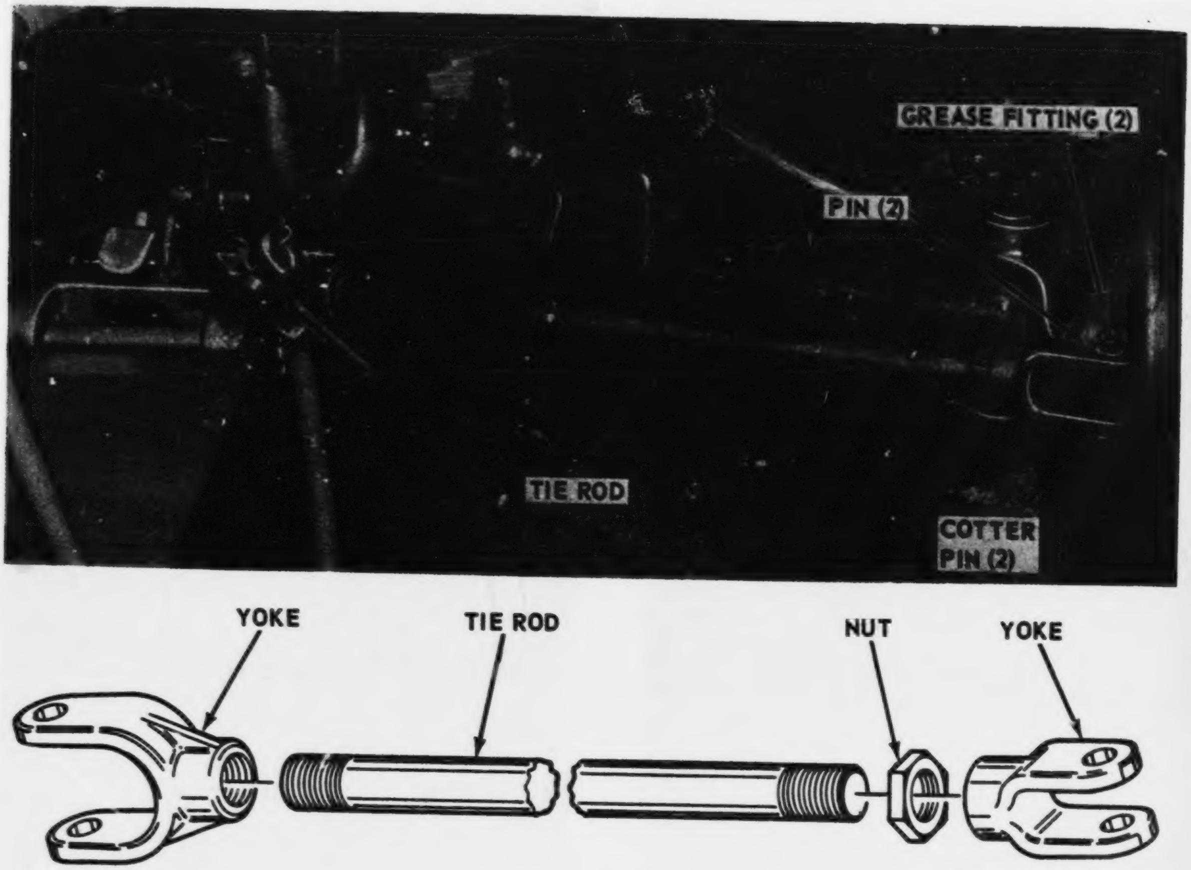
3-133. Tie Rods and Yokes

a. Removal.

(1) Remove front wheels (para 3-121).

(2) Remove tow bar (para 3-132).

(3) Remove tie rods and yokes as shown in figure 3-122.



ME 4310-338-15/3-122

REMOVAL

STEP 1. REMOVE COTTER PINS AND GREASE FITTINGS FROM EACH TIE ROD.

STEP 2. REMOVE PIN AT ENDS OF EACH TIE ROD. REMOVE TIE RODS.

STEP 3. UNSCREW AND REMOVE YOKES AND NUTS FROM TIE RODS.

INSTALLATION

STEP 1. INSTALL YOKES AND NUTS ON EACH TIE ROD.

STEP 2. PLACE TIE ROD IN MOUNTING POSITION AND INSTALL PIN AT EACH END.

STEP 3. INSTALL COTTER PINS AND GREASE FITTINGS.

STEP 4. ADJUST TIE RODS AS SHOWN IN FIGURE 3-123.

Figure 3-122. Tie rods and yokes; removal and installation.

b. Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect yokes and pins for cracks, breaks, distortion, or any other defect.

(3) Inspect tie rods for cracks, damaged threads, distortion, or any other defect.

(4) Inspect all other parts for cracks, breaks, tortion, damaged threads, of any other defect.

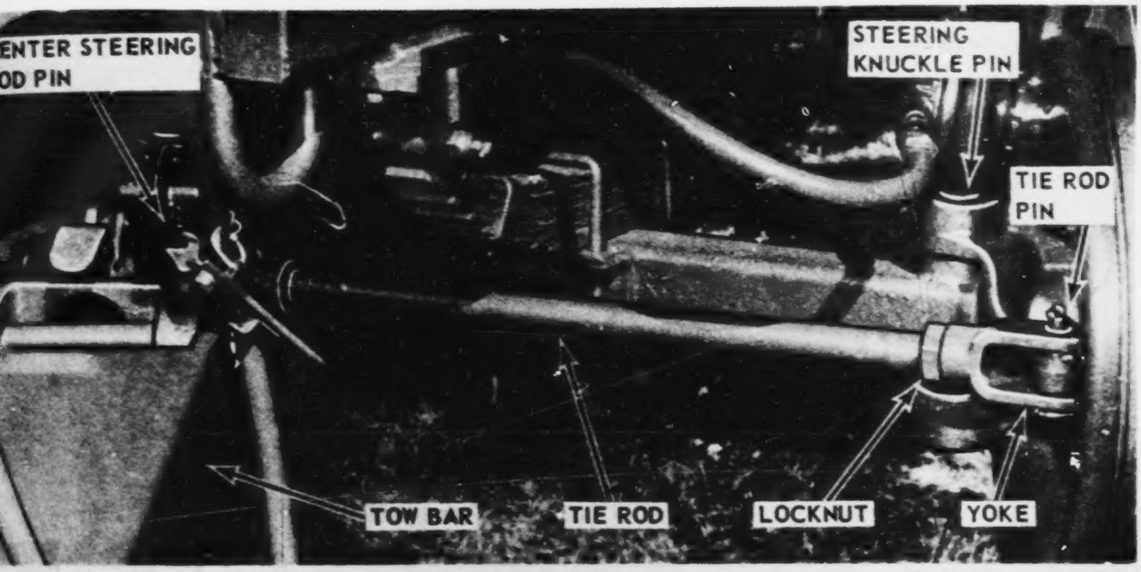
Installation.

(1) Install tie rods and yokes as shown in figure 22.

(2) Install tow bar (para 3-132).

(3) Install front wheels (para 3-121).

d. Adjustment. Adjust tie rods as shown in figure 3-123.



ME 4310-338-15/3-123

EP 1. POSITION TOW BAR STRAIGHT AHEAD.

EP 2. MEASURE DISTANCE FROM CENTER OF STEERING KNUCKLE PIN ON BOTH SIDES TO CENTER POINT ON TOW BAR. MOVE TOW BAR TO OBTAIN EQUAL MEASUREMENT.

EP 3. MEASURE DISTANCE FROM CENTER OF TIE ROD PIN TO CENTER OF CENTER STEERING ROD PIN.

EP 4. TO MAKE ADJUSTMENT, REMOVE TIE ROD PINS AND LOOSEN LOCK NUT. TURN TIE ROD IN OR OUT UNTIL THE LENGTH OF RODS ARE EQUAL. CONNECT ROD TO STEERING KNUCKLE.

STEP 5. MARK POINT ON OUTSIDE OF EACH FRONT WHEEL, AT HUB HEIGHT, AND MEASURE DISTANCE BETWEEN THESE POINTS.

STEP 6. DISTANCE BETWEEN MARKS SHOULD BE 1/4-INCH LESS THAN AT REAR WHEELS.

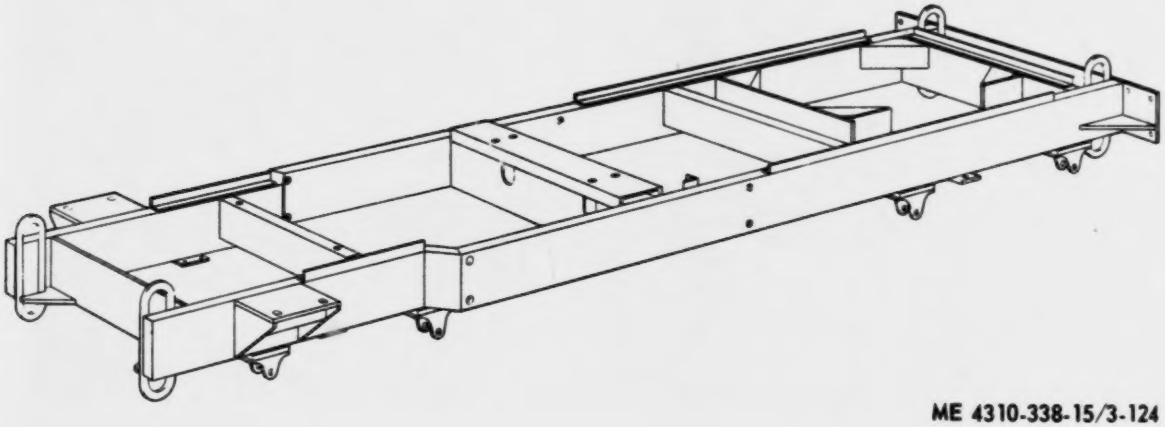
STEP 7. ADJUST CLEVISES EQUALLY UNTIL ADJUSTMENT IS OBTAINED. TIGHTEN LOCK NUTS.

Figure 3-123. Tie rod adjustment.

Section XX. FRAME AND BUMPERS

3-134. General

The frame is a welded assembly on which is mounted all of the air compressor unit components (fig. 3-124). The lifting and tie down eyes form an integral part of the frame assembly as does the main section of the rear bumper. In addition, two removable bumpers attach to the rear of the frame.



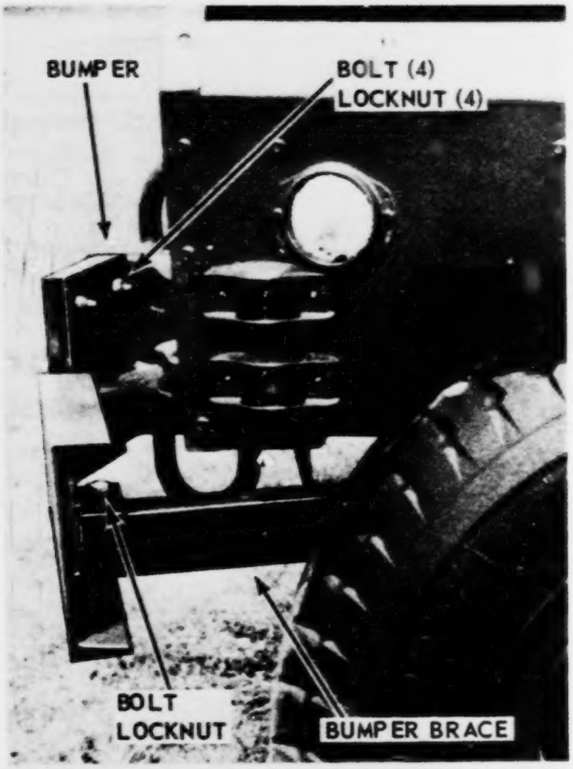
ME 4310-338-15/3-124

Figure 3-124. Frame assembly.

135. Bumper Assemblies

. *Removal.* Remove each bumper assembly as own in figure 3-125.

b. Installation. Install each bumper assembly as shown in figure 3-125.



ME 4310-338-15/3-125

REMOVAL

STEP 1. REMOVE BOLT AND LOCKNUT FROM BUMPER BRACE.

STEP 2. REMOVE BOLTS AND LOCKNUTS FROM BUMPER AND FRAME. REMOVE BUMPER.

INSTALLATION

STEP 1. POSITION BUMPER IN MOUNTING POSITION AND INSTALL BOLTS AND LOCKNUTS TO FRAME. DO NOT TIGHTEN.

STEP 2. INSTALL BOLTS AND LOCKNUTS ON BUMPER BRACE. TIGHTEN ALL LOCKNUTS.

Figure 3-125. Bumper Assemblies; Removal and Installation.

CHAPTER 4

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

4-1. Preparation of Equipment For Shipment and Storage

Detailed instructions for the preparation of the air compressor unit for storage and shipment are contained in TB 740-93-2.

Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

4-2. Demolitions Methods

Instructions for the destruction of equipment to prevent enemy use are contained in TM 750-244-3.

CHAPTER 5
DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

-1. Scope

a. The following instructions are intended for use y Direct Support, General Support, and Depot mainenance personnel. The instructions contain inforation on equipment maintenance that is beyond ne scope of tools, equipment, personnel, or supplies ormally available at the organizational level.

b. Appendix A lists the publications applicable to eld and depot maintenance. Appendix C is the Maintenance Allocation Chart. The Direct Support, General Support, and Depot maintenance repair parts are listed and illustrated in TM 5-4310-338-35P (When printed).

5-2. Forms and Records

For information pertaining to DA forms and records that are the responsibility of Direct Support, General Support, and Depot maintenance personnel, see paragraph 1-2.

Section II. DESCRIPTION AND DATA

-3. Description and Data

or a complete description of the Model 1M600RPV otary Air Compressor, see paragraph 1-3.

-4. Tabulated Data

a. General. This paragraph contains maintenance ata pertinent to Direct Support, General Support, nd Depot maintenance personnel. This information onsists of equipment classification and ratings, eplacement standards, an air piping diagram, a ompressor oil cycle diagram, time standards, and pecific torque data.

b. Engine Classification and Rating.

pe	Four-cycle Reciprocating Turbocharged Diesel
odel	Caterpillar Tractor Co. Model D333C-T
umber of Cylinders	6
ore and Stroke	4.75 in. x 6.0 in.
splacement	638 cu. in.
w Idle Speed	1000 RPM
igh Idle Speed	2050 RPM
overned Speed	1800 RPM
rake Horsepower (W/O Fan)	190@ 1800 RPM
ring Order	1—5—3—6—2—4
el Rack Setting	+.070"

c. Compressor Classification and Rating.

pe	Sliding Blade, Air, Rotary DED
odel	Davey Compressor Company 1M600RPV
rt Number	61438
ages	1
Air Volume	600 CFM
Air Pressure	100 PSI

d. Repair and Replacement Standards. Table 5-1 lists manufacturer's sizes, tolerances, desired clearances, and maximum allowable wear and clearances.

e. Spring Free Lengths. Table 5-2 lists the free length of certain springs that are used in the Model 1M600RPV Rotary Air Compressor. The components are listed under the appropriate functional index.

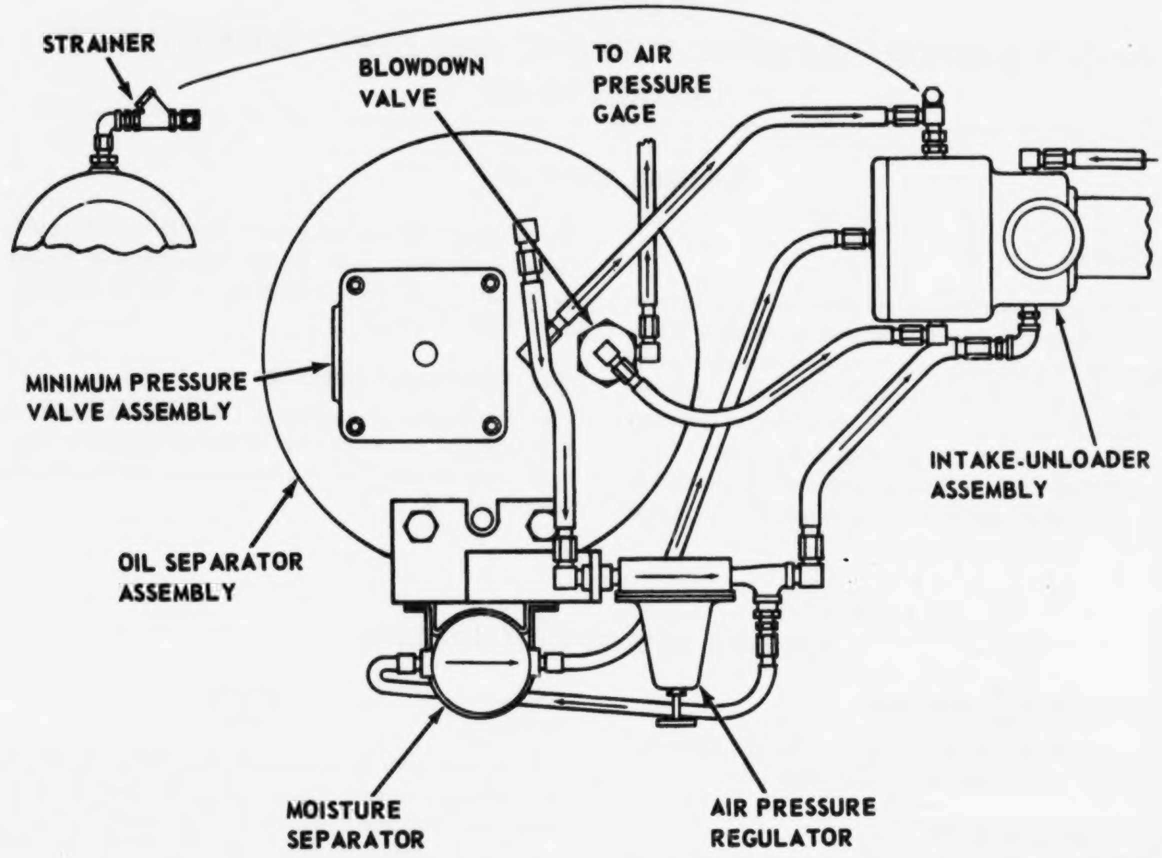
f. Schematic Wiring Diagram. See figure 1-3 for a schematic wiring diagram of the Model 1M600RPV Rotary Air Compressor.

g. Air Line Diagram. Figure 5-1 is the air line diagram for the Model 1M6000 RPV Rotary Air Compressor.

g. Air Line Diagram. Figure 5-1 is the air line diagram for the Model 1M600RPV Rotary Air Compressor.

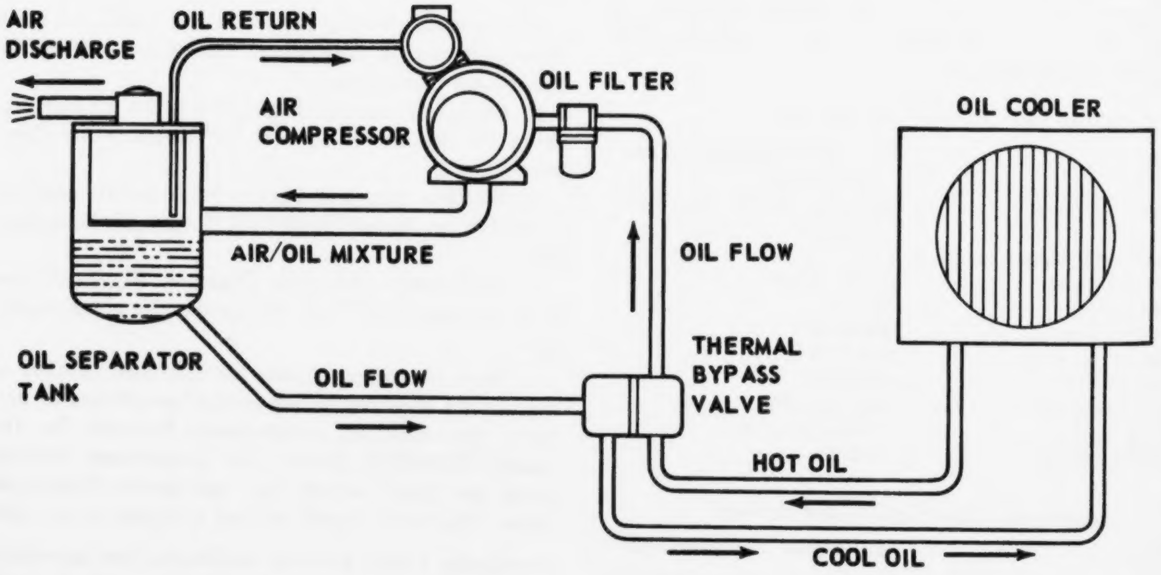
h. Compressor Oil Cycle Diagram. Figure 5-2 depicts the path of oil flow throughout the air compressor.

i. Time Standards. Table 5-3 lists the number of man-hours required under normal conditions to perform the indicated maintenance function for the Model 1M600RPV Rotary Air Compressor. Components are listed under the appropriate functional index. The times listed are not intended to be rigid standards. Under adverse conditions, the operations can take longer, but under ideal conditions with highly skilled mechanics, most of the operations could be accomplished in considerable less time.


STRAINER
BLOWDOWN VALVE
TO AIR PRESSURE GAGE
MINIMUM PRESSURE VALVE ASSEMBLY
INTAKE-UNLOADER ASSEMBLY
OIL SEPARATOR ASSEMBLY
MOISTURE SEPARATOR
AIR PRESSURE REGULATOR

ME 4310-338-15/5-1

Figure 5-1. Air Line Diagram.


AIR DISCHARGE
OIL RETURN
AIR COMPRESSOR
OIL FILTER
OIL COOLER
AIR/OIL MIXTURE
OIL FLOW
OIL SEPARATOR TANK
OIL FLOW
THERMAL BYPASS VALVE
HOT OIL
COOL OIL

ME 4310-338-15/5-2

Figure 5-2. Compressor oil cycle diagram.

Table 5-1. Repair and Replacement Standards

Component	Manufacturer's dimensions and tolerances in inches		Desired clearance		Maximum allowable wear and clearance
	Minimum	Maximum	Minimum	Maximum	
ENGINE					
Cylinder block					
Liner counterbore depth	0.400	0.402			
Camshaft bearing bore	2.5625	2.5635			
Main bearing bore	3.8155	3.8165			
Cylinder liner					
Inside diameter	4.750	4.752			0.006*
Flange thickness	0.4040	0.4056			
Projection above block	0.0020	0.0056			
Crankshaft					
Main journal diameter	3.499	3.500			0.008
Main bearing clearance			0.0030	0.0059	0.010
End clearance			0.006	0.019	0.035
Connecting rod journal diameter	2.999	3.000			0.007
Connecting rod out-of-round					0.004
Pistons					
Pin bore	1.6999	1.7003			
Piston pins					
Clearance in piston					0.006
Clearance in rod					0.006
Pin diameter	1.6997	1.7000			
Piston Rings					
Clearance:					
Top ring			0.0030	0.0044	0.006
Intermediate			0.0025	0.0039	0.006
Oil control ring			0.0015	0.0033	0.006
Gap (at unworn 4.750 in. diameter of liner bore):					
Top ring	0.017	0.023			
Intermediate ring	0.017	0.023			
Oil control ring	0.013	0.023			
Gap (at unworn 4.751 in. diameter of liner bore):					
Top ring	0.020	0.026			
Intermediate ring	0.020	0.026			
Oil control ring	0.016	0.026			
Gap (at unworn 4.752 in. diameter of liner bore):					
Top ring	0.023	0.029			
Intermediate ring	0.023	0.029			
Oil control ring	0.019	0.029			
Connecting rod					
Bearing clearance	0.0030	0.0059			0.010
Bearing bore in rod	3.2495	3.2505			
Pin bearing bore	1.7009	1.7015			
Center-to-center distance	9.594	9.596			
Crankshaft bearing bore	3.002	3.006			0.010
Pin diameter	1.6997	1.7000			
Camshaft					
Bearing journal diameter	2.3105	2.3115			
Bearing clearance			0.002	0.006	0.008
End clearance			0.004	0.010	0.025
Fuel injection pump housing					
Fuel rack					
Diameter	0.4983	0.4987			
Bearing bore	0.5007	0.5013			
Bearing clearance					0.005
Camshaft					
Bearing bore	1.875	1.876			
Bearing clearance					0.010
Journal diameter	1.8725	1.8735			
Pump plunger length	2.5931	2.5937			0.0050
Fuel transfer pump					
Total clearance, gear-to-cover	0.001	0.003			0.0035
Bearing bore (2)	0.4950	0.4956			0.003
Shaft diameter	0.4936	0.4938			
Bearing clearance	0.0012	0.0020			
Depth-body bore	0.3747	0.3753			

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sured near top of piston ring travel.

Table 5-1. Repair and Replacement Standards — Continued

Component	Manufacturer's dimensions and tolerances in inches		Desired clearance		Maximum allowable wear and clearance
	Minimum	Maximum	Minimum	Maximum	
Governor					
Backlash between drive gear and driven gear	0.000	0.006			
Turbocharger					
Shaft end clearance	0.006	0.011			
Bearing bore inside diameter	0.6268	0.6272			
Bearing outside diameter	0.9780	0.9785			
Housing bore	0.9827	0.9832			
Shaft bearing journal diameter	0.6250	0.6254			
Oil seal ring gap	0.001	0.006			
Oil Pump					
Drive shaft diameter	0.8745	0.8749			0.005
Clearance, gear-to-cover			0.002	0.004	
Drive idler gear shaft diameter	1.1220	1.1230			0.008
Idler gear shaft diameter	0.8745	0.8749			0.008
Bearing bore	0.8760	0.8766			
Bearing clearance			0.0011	0.0021	
Rocker arm					
Bearing bore	0.7260	0.7266			
Shaft diameter	0.7240	0.7520			
Shaft-to-bearing clearance					0.008
Valve lifters					
Lifter diameter	1.3100	1.3110			
Bore in block	1.3135	1.3155			
Lifter clearance					0.012
Valves, guides, and seat inserts					
Valves guide projection above head		0.875			
Exhaust valve seat insert outside diameter	2.0030	2.0040			
Inlet valve seat insert outside diameter	2.1280	2.1290			
Head bore for exhaust valve seat insert	2.0000	2.0010			
Head bore for inlet valve seat insert	2.1250	2.1260			
Exhaust valve head diameter	1.891	1.901			
Inlet valve head diameter	2.015	2.025			
Exhaust valve seat face diameter	1.810	1.860			
Inlet valve seat face diameter	1.934	1.984			
Valve stem diameter	0.3712	0.3722			0.0010
Valve guide bore (installed)	0.3736	0.3756			0.0010
Inlet valve lip thickness	0.057				
Exhaust valve lip thickness	0.070				
Closed inlet valve projection		0.138			
Closed exhaust valve projection		0.128			
Depth of bore in head for valve seat inserts	0.448	0.450			
Valve seat width		0.095			
Exhaust valve clearance				0.025	
Inlet valve clearance				0.015	
Water pump					
Clearance, impeller-to-housing	0.010	0.030			
Drive gear train					
Oil pump idler gear					
Bearing bore	1.1245	1.1255			
Bearing clearance			0.0015	0.0035	
Accessory drive idler gear					
Backlash between idler gear and camshaft gear	0.001	0.013			
End clearance			0.004	0.016	0.018
Bearing bore	1.376	1.381			
Bearing-to-shaft clearance			0.002	0.006	0.009
COMPRESSOR:					
Drive end cover					
Bearing bore diameter	5.9055	5.9071			
Bearing bore depth	3.115	3.125			
Non-drive end cover					
Bearing bore diameter	5.9055	5.9071			
Bearing bore depth	3.115	3.125			
Bearing Retaining Covers					
Mounting flange to face	0.615	0.620			

Table 5-1. Repair and Replacement Standards — Continued

Component	Manufacturer's dimensions and tolerances in inches		Desired clearance		Maximum allowable wear and clearance
	Minimum	Maximum	Minimum	Maximum	
Stator					
Length	19.007	19.010			
Inside diameter	9.798	9.804			
Rotor					
Length	18.993	18.996			
Outside diameter	8.497	8.500			
Bore (not at keyway)	2.7583	2.7593			
Blade slot width	0.312	0.315			
Shaft					
Bearing journals	2.7563	2.7568			
Rotor journal	2.7563	2.7573			
Coupling journal	2.749	2.750			
Concentricity (T.I.R.)		0.001			
Blades (new)					
Length	6.318	6.320			
Height	2.185	2.190			2.123
Thickness	0.3088	0.3118			
Clearance in slot			0.0002	0.0062	
FRONT AXLE:					
Steering parts					
King pins	1.2380	1.2390			
Center pin	1.2380	1.2390			
Yoke pins	0.748	0.750			

Table 5-2. Spring Free Length Table

Spring	Free length (in inches)
01 ENGINE	
0105 Valves, camshaft, and timing system:	
Rocker arm shaft spring	4.00
Rocker arm shaft spring (end)	0.0826 ± 0.005
Valve springs	2.05
0106 Engine lubrication system:	
Oil pump assembly	
Bypass valve spring	3.57
Oil filter assembly	
Element seat springs	3 61/64
Relief valve spring	1 15/16
Oil cooler assembly	
Valve springs	3.61
03 FUEL SYSTEM	
0302 Fuel pumps:	
Fuel injection pump housing assembly	
Lifter springs	1.59
Check valve springs	0.34
Fuel priming pump	
Sealing spring	0.975
Valve spring	5/16 to 3/8
Fuel line spring	1/2
0308 Engine speed governor and controls:	
Collar guide spring	0.68
Speed limiter plunger spring	2.62
Low idle adjustment spring	2.08
Piston return spring	0.344
0309 Fuel filters:	
Fuel pressure regulator valve spring	1 41/64

Table 5-2. Spring Free Length Table — Continued

Spring	Free length (in inches)
12 BRAKES	
1206 Mechanical brakes:	
Spring brake assembly	
Spring	7 11/16"
1207 Air brake system:	
Relay-emergency valve	
Check valve spring	21/32
Inlet poppet spring	21/32
Piston spring	1 53/64
Exhaust poppet spring	1 9/64 ± 3/64
Valve cartridge spring	1 15/64
50 PNEUMATIC EQUIPMENT	
5001 Crankcase, block, and cylinder head:	
Stator	
Relief drain valve springs	7/8
5006 Lubrication system	
Thermal bypass valve assembly	
Plunger spring	1 3/16
Guide spring	1 3/16
5009 Unloader system components:	
Minimum pressure valve spring	6 1/8
Blowdown valve assembly spring	1 3/8
Intake control	
Valve return spring	3 5/8
Valve spring	3
Drain valve spring	1
Air pressure regulator assembly	
Adjustment spring	2.362 ± .060
Valve spring	1.750

Table 5-3. Time Standards

Lubrication and service	Man-hours
01 ENGINE	
0101 Crankcase, block, cylinder head:	
Crankcase	
(to drain crankcase and refill with new oil)	0.3
0106 Engine lubrication system:	
Oil filter assembly	
(to replace elements, clean cases with solvent, dry, and inspect)	0.3
Crankcase breather	
(to replace filter cartridge)	0.2
03 FUEL SYSTEM	
0304 Engine air cleaner:	
Air cleaner assembly	
(to replace element, clean case with solvent, dry, and inspect)	0.8
Element, air cleaner	
(to wash, dry, and inspect element)	0.3
0309 Fuel filters:	
Primary fuel filter assembly	
(to clean case in solvent, clean element, dry components, and inspect)	0.3
Final fuel filter assembly	
(to replace element, clean case with solvent, dry, and inspect)	0.3
05 COOLING SYSTEM	
0501 Radiator:	
Radiator assembly	
(to drain radiator, clean, and replenish coolant)	0.5
0505 Fan assembly:	
Fan pulley	
(to lubricate fan pulley)	0.1

Table 5-3. Time Standards — Continued

Lubrication and service	Man-hours
06 ELECTRICAL SYSTEM	
0612 Storage batteries:	
Batteries	
(to check electrolyte level, add water, clean cap vent holes and cables)	0.5
10 FRONT AXLE	
1000 Front axle assembly	
Front axle	
(to lubricate all grease fittings)	0.3
13 WHEELS	
1311 Wheel assembly:	
Bearings, wheel	
(to remove, clean with solvent, inspect and repack wheel bearings)	0.8
1313 Tires and tubes:	
Tires and tubes	
(to check and inflate tires to correct pressure)	0.2
14 STEERING	
1401 Steering assembly	
Tie rods, drag links, and bell cranks	
(to lubricate all grease fittings)	0.3
50 PNEUMATIC EQUIPMENT	
5006 Lubrication system:	
Oil separator assembly	
(to drain all oil and refill)	0.6
Element, oil separator assembly	
(to replace element)	2.5
Oil filter assembly	
(to remove and replace element, clean case, dry components, inspect, and reassemble)	0.3
5008 Air intake:	
Air cleaner assembly	
(to replace element, clean case with solvent, dry, inspect, and reassemble)	1.0
Element, air cleaner	
(to wash, dry, inspect element, and reinstall)	0.9
5009 Unloader system components:	
Air line strainer	
(to remove element, clean with solvent, dry, inspect, and reinstall)	0.1
5012 Throttling devices:	
Moisture separator assembly	
(to drain)	0.1
Element, moisture separator assembly	
(to replace element)	0.2

Removal and replacement	Man-hours
01 ENGINE	
0100 Engine assembly:	
Engine assembly	
(includes removal and installation of necessary housing components, control panel and controls, lines and fittings, wiring, fan guard, and air compressor)	10.0
0101 Crankcase, block, and cylinder head:	
Glow plugs (each)	0.1
Precombustion chambers (each)	0.1
Cylinder head	
(includes removal and installation of turbocharger, glow plugs, precombustion chambers, valve cover, and wiring)	8.0
Cylinder liners (each)	0.2
Block	
(includes removal and installation of engine assembly and all components connected to engine assembly)	32.0
0102 Crankshaft (with engine assembly removed):	
Crankshaft	2.0
Main bearings (all)	1.0
Oil seals (all)	0.3
Vibration damper	0.2

Table 5-8. Time Standards — Continued

Removal and replacement	**Man-hours**
0103 Flywheel assembly (with engine assembly removed)	
Flywheel	0.2
Flywheel gear ring	0.5
Flywheel housing	0.3
0104 Pistons, connecting rods (with engine assembly removed):	
Connecting rods (all)	1.2
Pistons, rings, pins, and retainers (all)	2.0
0105 Valves, camshaft, and timing system (with engine assembly removed):	
Valves (each)	0.1
Valve seats (each)	0.5
Guides, springs, and locks (one cylinder)	0.8
Rocker arms (all)	0.3
Valve cover	0.1
Valve lifters (each)	0.1
Push rods (one cylinder)	0.1
Camshaft bearings (all)	0.5
Camshaft	0.2
Timing gear cover	1.0
Timing gears (all)	1.0
Cover thrust washer	0.2
0106 Engine lubrication system:	
Oil pan and plate	1.0
Oil pump assembly (includes removal and installation of oil pan and plate)	1.2
Oil cooler assembly	0.3
Oil filter assembly	0.2
Crankcase breather assembly	0.1
Crankcase breather element	0.1
Oil lines and fittings	0.5
0108 Manifolds:	
Exhaust manifold	0.5
0109 Accessory drive mechanism:	
Fuel injection pump and fuel transfer pump	
Drive mechanism (includes removal and installation of fuel transfer pump, fuel injection pump housing, and governor assemblies)	1.0
03 FUEL SYSTEM	
0301 Fuel injectors:	
Fuel injection valves (each)	0.1
0302 Fuel pumps:	
Fuel injection pump plungers (each)	0.2
Fuel injection pump housing assembly (includes removal and installation of governor assembly)	1.0
Fuel transfer pump	2.0
0304 Engine air cleaner:	
Air cleaner assembly	1.0
Air cleaner cap	0.1
Hoses and clamps	0.3
0305 Turbocharger:	
Turbocharger assembly (includes piping)	2.0
0306 Tanks, lines, and fittings:	
Fuel tank (each) (includes necessary housing to provide access to tank)	1.0
Fuel lines and fittings (total)	0.4
0308 Engine speed governor and controls:	
Governor assembly	1.0
0309 Fuel filters:	
Pressure regulator valve	0.1
Fuel pump starting tank	0.5
Primary fuel filter	0.4
Final fuel filter	0.4
0311 Engine starting aids:	
Cold weather starting aid (complete)	0.8
Fuel cylinder	0.1
Control cable	0.4

Table 5-3. Time Standards — Continued

Removal and replacement	Man-hours
04 EXHAUST SYSTEM	
0401 Exhaust pipe:	
Exhaust pipe	0.3
Rain shield	0.1
05 COOLING SYSTEM	
0501 Radiator:	
Radiator assembly (includes removal and installation of radiator-oil cooler assembly)	7.0
Radiator cap	0.1
0503 Water mainfold, headers, thermostat, and housing gaskets:	
Radiator hoses and hose clamps (all)	0.6
Water temperature regulator	0.4
0504 Water pump:	
Water pump assembly	1.5
0505 Fan assembly:	
Fan assembly	0.2
Drive belts (includes adjustment)	0.5
Fan guard	0.3
Fan pulley (includes removal and installation of radiator-cooler assembly)	4.0
06 ELECTRICAL SYSTEM	
0601 Generator assembly	
Generator assembly	0.3
Brushes (generator removed)	1.0
Pulley (generator removed)	0.3
0602 Generator regulator:	
Generator regulator assembly	0.3
0603 Starting motor:	
Starting motor assembly	0.5
Solenoid and switches (starting motor removed)	0.5
0606 Engine safety controls:	
Overspeed governor switch	0.3
Low oil pressure switch	0.3
High water temperature switch	0.3
Low fuel pressure switch	0.3
Fuel rack shutoff solenoid	0.3
Air pressure switch	0.3
0607 Instrument and engine control panel:	
Ammeter	0.4
Fuel level gage	0.8
Panel light	0.2
Panel light switch	0.2
Heat-start switch	0.4
Wiring harness	0.7
0609 Lights:	
Tail and stop light assembly (each)	1.0
Blackout tail, stop, and turn light assembly (each)	0.8
Clearance light assembly (each)	0.5
0612 Storage batteries:	
Battery (all)	0.6
Battery cables	0.5
Battery tray	0.6
0613 Hull or chassis wiring harness:	
Wiring harness, external lighting	1.5
0615 Radio interference suppression:	
Braided electrical lead	0.2
Cables (each)	0.1
10 FRONT AXLE	
1000 Front axle assembly:	
Front axle assembly (includes removal and installation of wheels)	8.0
Safety chains	1.5
11 REAR AXLE	
1100 Rear axle assembly:	
Rear axle assembly (includes removal and installation of wheels)	6.0

Table 5-3. Time Standards — Continued

Removal and replacement	Man-hours
12 BRAKES	
1201 Hand brakes:	
Hand brake lever	1.0
Clevis pins and linkage	0.5
1202 Service brakes:	
Wedge brake assembly (each) (includes removal and installation of wheels)	3.0
Brake shoes	1.0
1206 Mechanical brakes:	
Spring brake assembly (each)	1.0
1207 Air brake system:	
Service chamber (each)	0.6
Air reservoir	1.0
Relay-emergency valve	1.3
Lines, hoses, and fittings (all)	1.0
1211 Trailer brake connections and controls:	
Intervehicular couplings (all)	0.6
Intervehicular hose assemblies (all)	0.3
13 WHEELS	
1311 Wheel assemblies:	
Wheel (each)	0.2
Brake drum and hub (each)	0.5
Wheel bearing (each)	0.6
1313 Tires and tubes:	
Tire and tube (each) (includes removal and installation of wheel)	1.0
14 STEERING	
1401 Steering assembly:	
Tie rod assembly (each)	2.0
Spindle and knuckle assembly (each)	2.0
King pin (each)	0.5
Yoke pin (each)	0.5
Lubrication fitting (each)	0.4
Center arm	1.2
15 FRAME	
1501 Frame assembly:	
Frame assembly	75.0
Fenders and hangers	5.0
1503 Pintles and towing attachments:	
Towbar	0.5
16 SPRINGS AND SHOCK ABSORBERS	
1601 Springs:	
Front spring (each)	1.9
Rear spring (each)	1.7
18 BODY, HOOD, AND HULL	
1801 Housing group:	
Grille	0.8
Hood support (each)	1.0
End panel (each)	0.6
Door support (each)	0.6
Door (each)	0.4
Tray (each)	0.8
Rail (each)	0.6
Roof (each)	1.0
Roof bulkhead (each)	1.8
Side panel (each)	1.6
22 BODY, CHASSIS, OR HULL AND ACCESSORY ITEMS:	
2202 Accessory items:	
Safety reflectors (each)	0.1
Battery charging receptacle	0.2
2210 Data plates and instruction holders:	
Transportation data plate	0.1
Operating instruction plate	0.1
U. S. Army identification plate	0.1

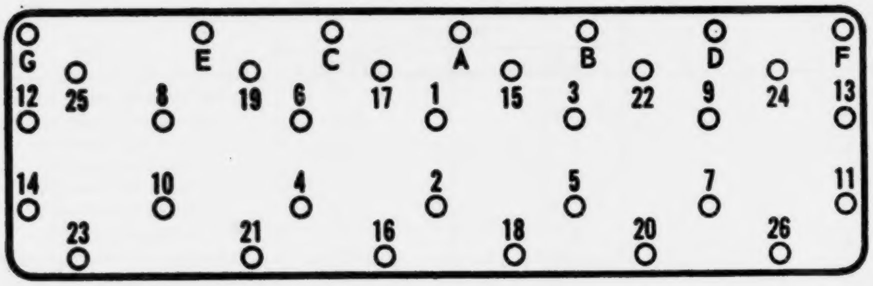
Table 5-3. Time Standards — Continued

Removal and replacement	Man-hours
Rotary compressor plate	0.1
Engine data plate	0.3
47 GAGES (NON-ELECTRICAL)	
4701 Instruments (speed and distance):	
Tachometer-hourmeter	0.1
Tachometer cable	0.2
4702 Gages, mountings, lines, and fittings:	
Air pressure gage	0.5
Oil level gage (oil separator)	0.2
Air cleaner restriction indicators	0.2
Oil pressure gage	0.4
Fuel pressure gage	0.4
Water temperature gage	0.4
Lines and fittings (all)	3.0
50 PNEUMATIC EQUIPMENT	
5000 Air compressor assembly:	
Air compressor assembly (includes removal and installation of necessary housing components, piping, oil filter, and coupling components)	6.0
5001 Crankcase, block and cylinder head:	
Stator (with air compressor removed)	0.8
Stator relief drain valves	0.3
5004 Rotor (with air compressor assembly removed):	
Rotor	1.0
Drive end bearing	0.5
Non-drive end bearing	0.5
Rotor shaft	1.0
Blades	0.3
Seal sleeves	0.5
5006 Lubrication system:	
Oil separator assembly (includes removal and installation of necessary housing components, and piping)	5.0
Element, oil separator assembly	2.5
Oil filter assembly	0.3
Oil cooler (Includes removal and installation of radiator-oil cooler assembly)	5.0
Thermal bypass valve assembly	0.6
Oil lines and fittings (all)	1.5
5007 Compressor drive (includes removal and installation of air compressor assembly):	
Coupling	6.3
Locking straps	6.5
Bushings	6.3
Pins	6.2
5008 Air intake:	
Air cleaner assembly	1.5
Air cleaner cap	0.1
Hoses, clamps and elbows	0.3
5009 Unloader system components:	
Minimum pressure valve	0.5
Blowdown valve assembly	0.4
Safety relief valve	0.3
Air line strainer	0.2
Air lines and fittings (each)	0.4
Intake control valve	0.3
Intake control diaphragm	0.3
Air pressure regulator assembly	0.3
5012 Throttling devices:	
Speed control linkage	0.4
Moisture separator assembly	0.2
5015 Air discharge system:	
Discharge manifold	0.3
Service valves (all)	0.4
Globe valve	0.4

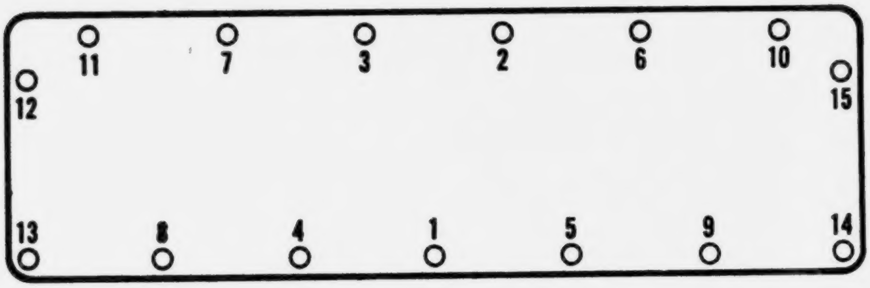
i. Torque Data. Table 5-4 lists the torque values for tightening certain nuts, bolts, screws, and components on the Model 1M600RPV Rotary Air Compressor. Each item is listed under the appropriate functional index.

Table 5-4. Torque Data

Item	Torque value
01 ENGINE	
0101 Crankcase, block, and cylinder head:	
Glow plugs	8-10 ft lb
Precombustion chambers	150 ft lb
Cylinder head capscrews	
Follow numerical sequence shown on figure 5-3:	
Initial	115 ft lb
Intermediate	170-180 ft lb
Final	170-180 ft lb
Follow alphabetical sequence shown on figure 5-3:	
Initial	22 ft lb
Intermediate	27-37 ft lb
Final	27-37 ft lb
0102 Crankshaft:	
Main bearing capscrews	165-185 ft lb
Pulley retaining capscrews	165-185 ft lb
0103 Flywheel assembly:	
Flywheel retaining capscrews	130-170 ft lb
Flywheel housing retaining capscrews	65-85 ft lb
0104 Pistons and connecting rods:	
Connecting rod bolts	
Initial	27-33 ft lb
Plus additional turn of	90°
0105 Valves, camshafts, and timing system:	
Rocker arm retaining capscrews	170-180 ft lb
Camshaft retaining capscrews	27-37 ft lb
Valve cover capscrews	
Follow numerical sequence shown on figure 5-3:	6-10 ft lb
0106 Engine lubrication system:	
Oil pump drive gear retaining nut	60 ft lb
0109 Accessor drive mechanism:	
Gear retaining nut	90-100 ft lb
03 FUEL SYSTEM	
0301 Fuel injectors:	
Valve retaining nut	100-110 ft-lb
0302 Fuel pumps:	
Fuel injecting pump	
Retaining bushing	140-160 ft-lb
Fuel transfer pump drive	
Gear retaining nut	17-27 ft-lb
0305 Turbocharger:	
Impeller housing band clamp	110-130 in-lb
Turbine housing capscrews	160-190 in-lb
Thrust plate assembly	
Retaining capscrews	30-40 in-lb
Impeller retaining nut	
Initial (hot)	120 in-lb
Final (room temperature or 150 max)	20 in-lb
Plus additional turn of	120°
Turbocharger-to-manifold capscrews	36-44 ft-lb
05 COOLING SYSTEM	
0504 Water pump:	
Impeller retaining nut	25-27 ft-lb
06 ELECTRICAL SYSTEM	
0601 Generator assembly:	
Pulley-to-shaft nut	75-90 ft-lb
50 PNEUMATIC EQUIPMENT	
5006 Lubrication system:	
Oil separator cover capscrews	250 ft-lb



A CYLINDER HEAD CAPSCREWS



B VALVE COVER CAPSCREWS

ME 4310-338-15/5-3

Figure 5-3. Capscrew tightening sequence for cylinder head and valve cover.

Section III. REPAIR PARTS, SPECIAL TOOLS, AND EQUIPMENT

-5. Special Tools and Equipment

here are no special tools or equipment required to erform the repair and overhaul procedures on the odel 1M600RPV Rotary Air Compressor.

-6. Direct Support, General Support, and epot Maintenance Repair Parts

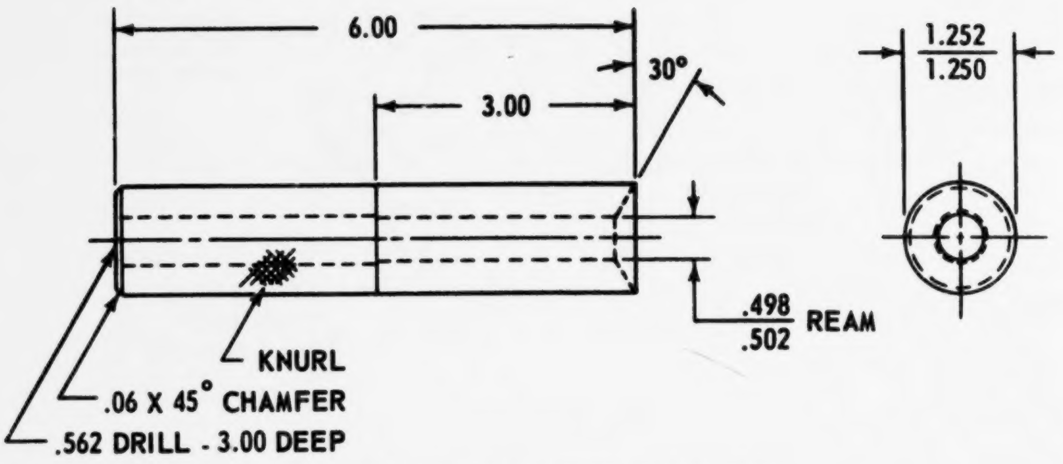
irect, General Support and Depot maintenance epair parts are listed and illustrated in TM 5-4310-38-35P (when printed).

5-7. Specially Designed (Fabricated) Tools and Equipment

Specially designed tools and equipment are illustrated in figure 5-4 through 5-12 and listed in Table 5-5. These items are for Direct Support, General Support, and Depot level personnel performing maintenance on the Model 1M600RPV Rotary Air Compressor. The tools and equipment are not available through normal issue channels, but must be fabricated by qualified maintenance personnel.

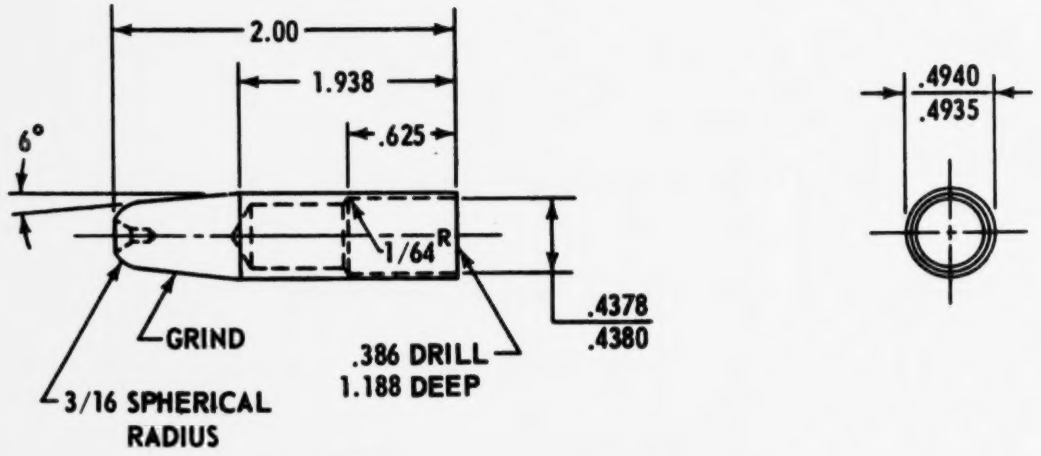
Table 5-5. *Specially Designed (Fabricated) Tools & Equipment*

Item	Reference		Use
	Fig.	Para.	
Seal tamping tool	5-4	6-14	Fuel transfer pump seal installation
Seal tamping tool guide	5-4	6-14	Fuel transfer pump seal installation
Fixture adapter	5-5	6-12	Turbocharger assembly
Fixture	5-5	6-12	Turbocharger assembly
Supporting screw	5-5	6-12	Turbocharger assembly
Wrench	5-6	6-12	Turbocharger assembly
Wood dowel	5-6	6-12	Turbocharger assembly
Bearing tool	5-7	6-27	Rocker arm bearing installation
Bearing tool	5-8	6-39	Main bearing removal and installation
Flywheel lifting bracket	5-9	6-32	Flywheel removal and installation
Crankshaft seal installation tools	5-10	6-39	Crankshaft seal installation
Water pump seal installation tool	5-11	6-25	Water pump assembly
Interference test block	5-12	6-6	Starting motor testing and adjustment


6.00
30°
3.00
1.252
1.250
.498
.502
REAM
KNURL
.06 X 45° CHAMFER
.562 DRILL - 3.00 DEEP

MAKE FROM MILD STEEL BAR STOCK

A SEAL TAMPING TOOL

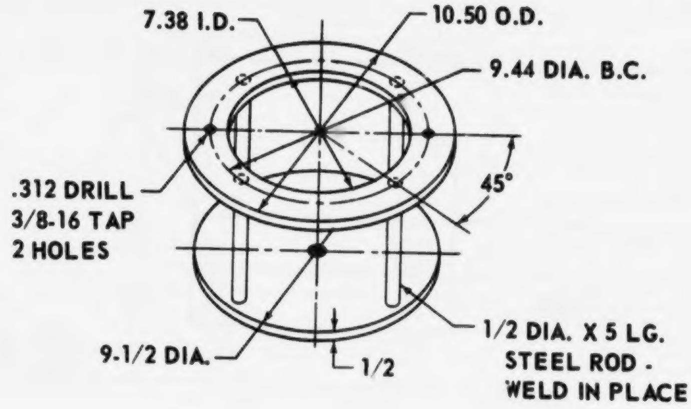

2.00
1.938
.625
6°
1/64 R
.4940
.4935
.4378
.4380
GRIND
.386 DRILL
1.188 DEEP
3/16 SPHERICAL
RADIUS

MAKE FROM MILD STEEL BAR STOCK

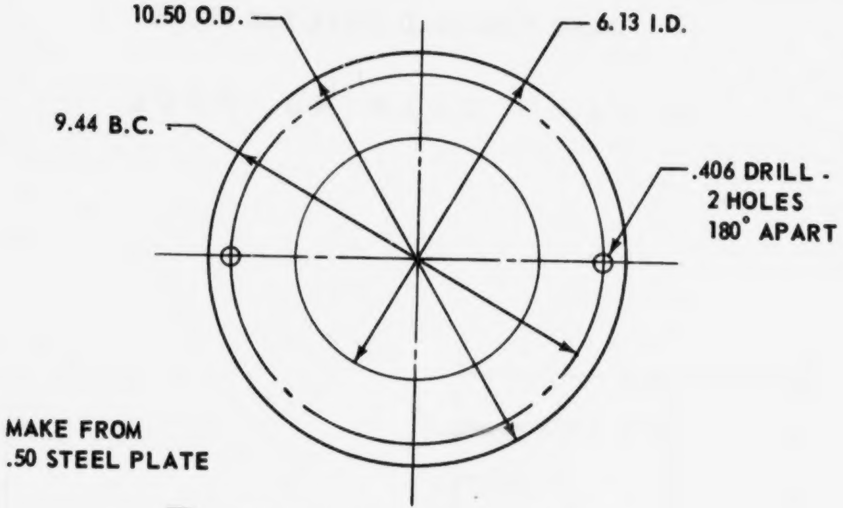
B SEAL TAMPING TOOL GUIDE

ME 4310-338-15/5-4

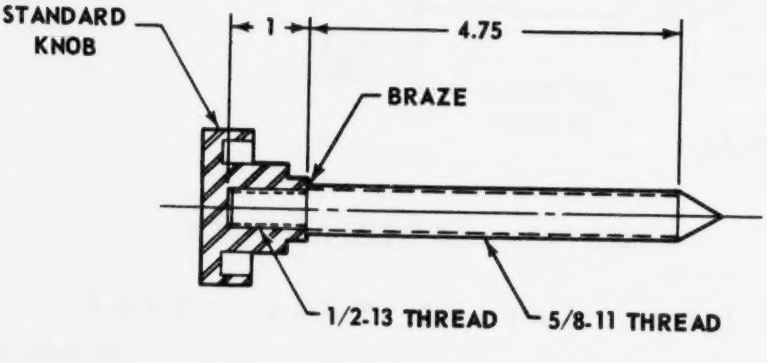
Figure 5-4. Fabrication of seal tamping tool and guide; fuel transfer pump seal installation.


7.38 I.D.
10.50 O.D.
9.44 DIA. B.C.
.312 DRILL
3/8-16 TAP
2 HOLES
45°
9-1/2 DIA.
1/2
1/2 DIA. X 5 LG.
STEEL ROD -
WELD IN PLACE

A FIXTURE


10.50 O.D.
6.13 I.D.
9.44 B.C.
.406 DRILL -
2 HOLES
180° APART
MAKE FROM
.50 STEEL PLATE

B FIXTURE ADAPTER


STANDARD
KNOB
1
4.75
BRAZE
1/2-13 THREAD
5/8-11 THREAD

C SUPPORTING SCREW

ME 4310-338-15/5-5

Figure 5-5. Fabrication of fixture; turbocharger assembly.

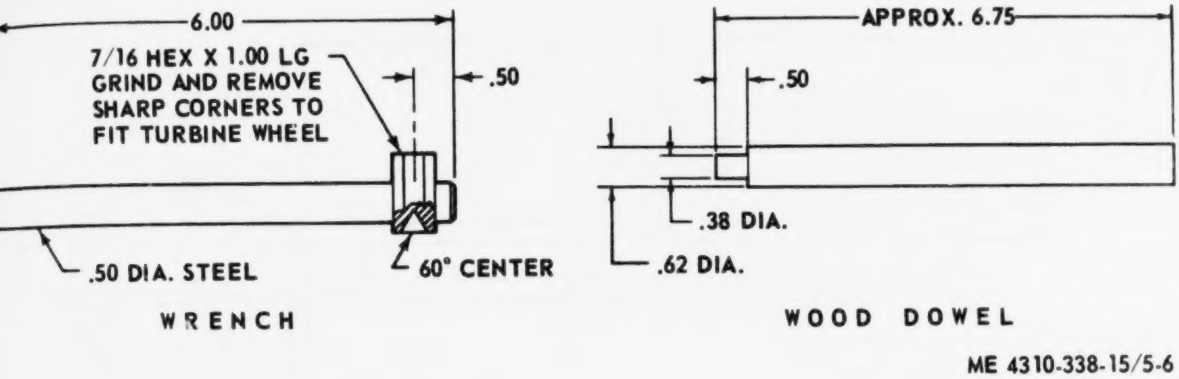

6.00
7/16 HEX X 1.00 LG
GRIND AND REMOVE
SHARP CORNERS TO
FIT TURBINE WHEEL
.50
.50 DIA. STEEL
60° CENTER
WRENCH
APPROX. 6.75
.50
.38 DIA.
.62 DIA.
WOOD DOWEL
ME 4310-338-15/5-6

Figure 5-6. Fabrication of wrench and wood dowel; turbocharger assembly.

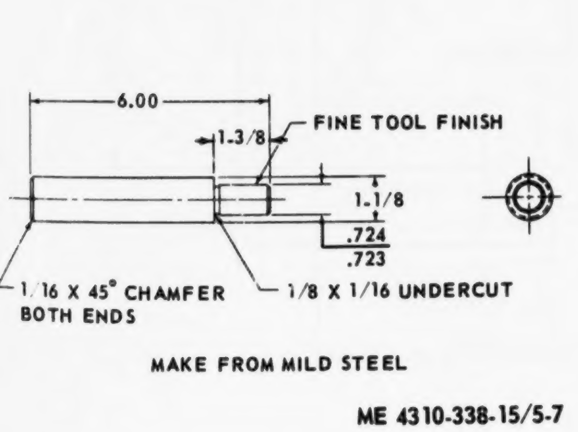

6.00
1-3/8
FINE TOOL FINISH
1-1/8
.724
.723
1/16 X 45° CHAMFER
BOTH ENDS
1/8 X 1/16 UNDERCUT
MAKE FROM MILD STEEL
ME 4310-338-15/5-7

Figure 5-7. Fabrication of rocker arm bearing installation tool.

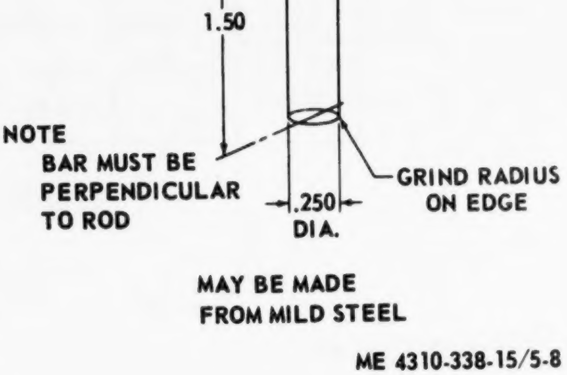
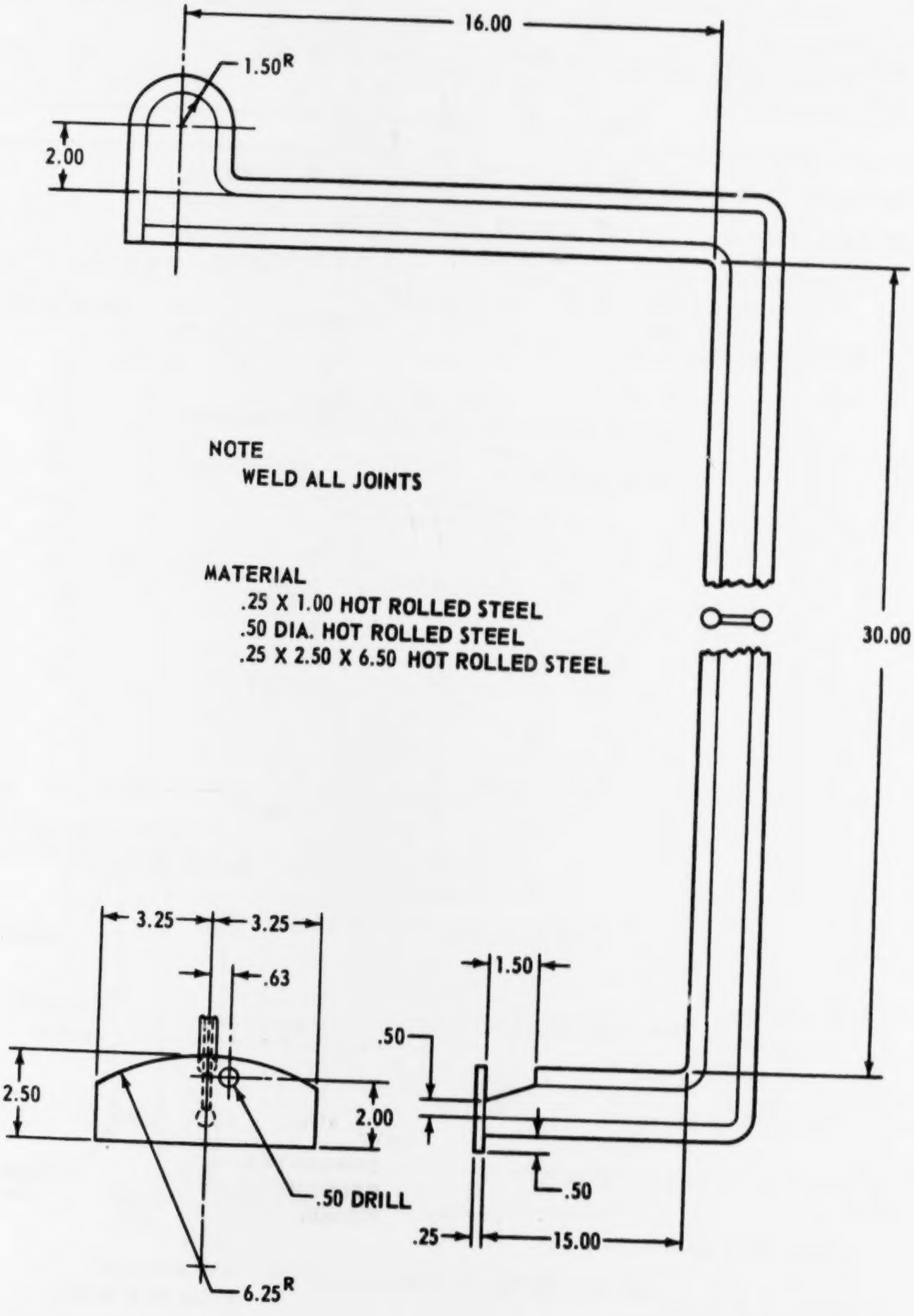

.250
1.00
.120
WELD
1.50
NOTE
BAR MUST BE
PERPENDICULAR
TO ROD
.250
DIA.
GRIND RADIUS
ON EDGE
MAY BE MADE
FROM MILD STEEL
ME 4310-338-15/5-8

Figure 5-8. Fabrication of main bearing removal and installation tool.

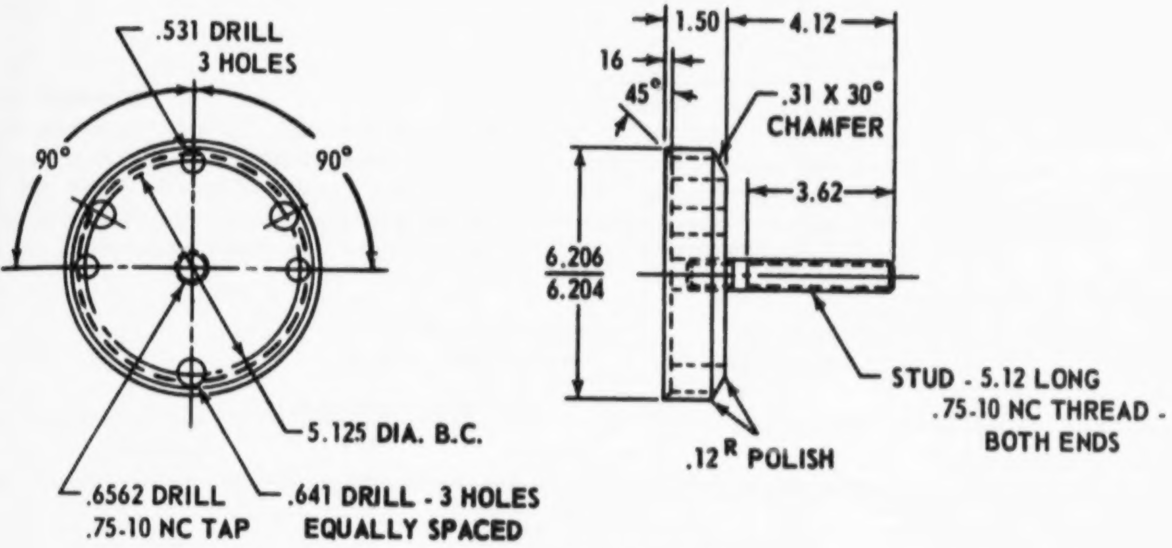

16.00
1.50R
2.00
30.00
3.25
3.25
.63
1.50
.50
2.50
2.00
.50 DRILL
.50
.25
15.00
6.25R

NOTE
WELD ALL JOINTS

MATERIAL
.25 X 1.00 HOT ROLLED STEEL
.50 DIA. HOT ROLLED STEEL
.25 X 2.50 X 6.50 HOT ROLLED STEEL

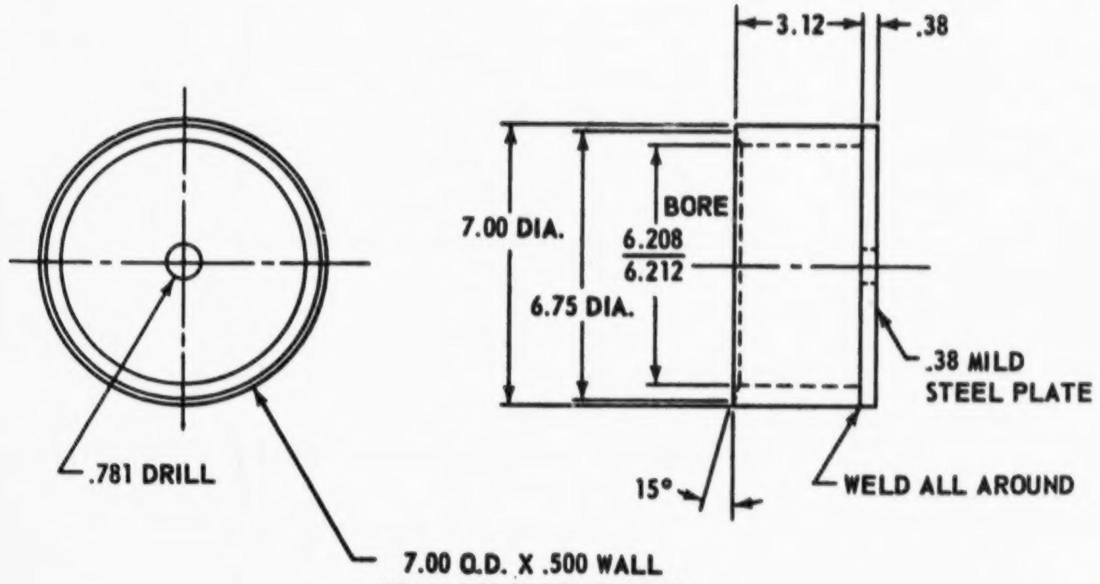
ME 4310-338-15/5-9

Figure 5-9. Fabrication of flywheel lifting bracket.


.531 DRILL
3 HOLES
90°
90°
5.125 DIA. B.C.
.6562 DRILL
.75-10 NC TAP
.641 DRILL - 3 HOLES
EQUALLY SPACED
1.50
4.12
16
45°
.31 X 30°
CHAMFER
3.62
6.206
6.204
STUD - 5.12 LONG
.75-10 NC THREAD -
BOTH ENDS
.12 R POLISH

MAKE FROM MILD STEEL

A PILOT


3.12
.38
7.00 DIA.
BORE
6.208
6.212
6.75 DIA.
.38 MILD
STEEL PLATE
15°
WELD ALL AROUND
.781 DRILL
7.00 O.D. X .500 WALL
SEAMLESS STEEL TUBING

B SLEEVE

ME 4310-338-15/5-10

Figure 5-10. Fabrication of crankshaft seal installation tools.

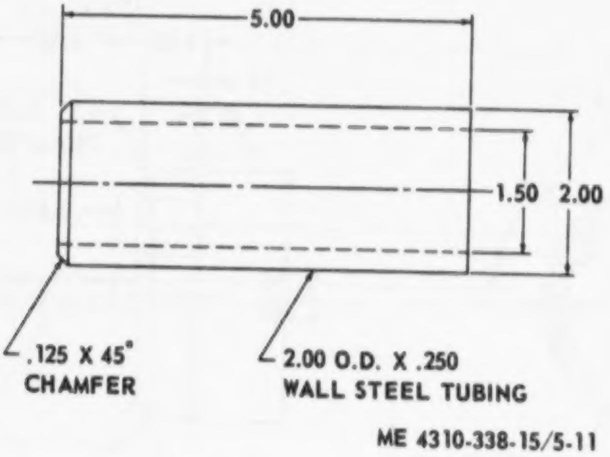

5.00
1.50
2.00
.125 X 45°
CHAMFER
2.00 O.D. X .250
WALL STEEL TUBING
ME 4310-338-15/5-11

Figure 5-11. Fabrication of water pump seal installation tool.

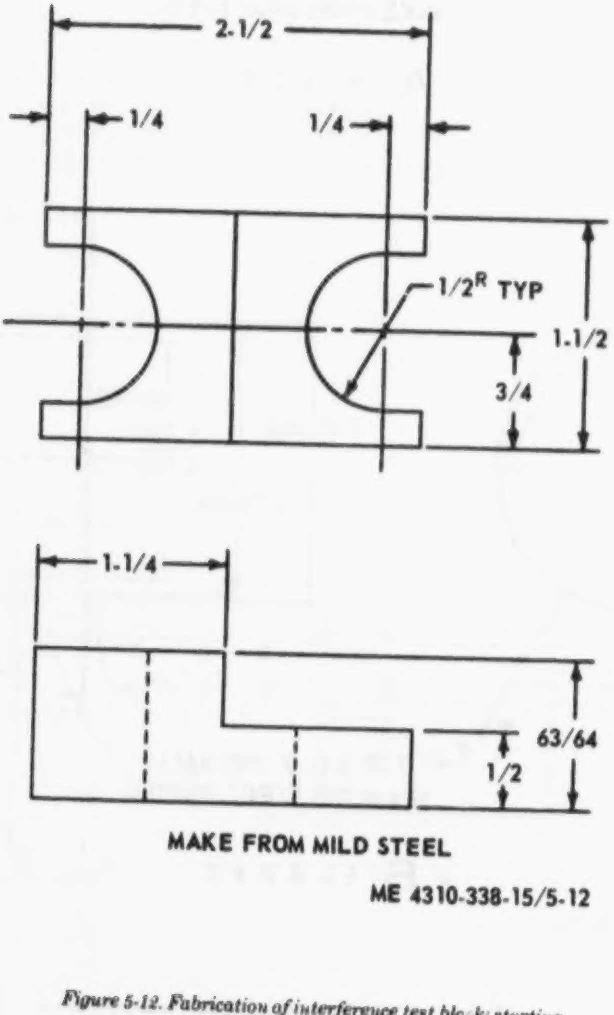

2-1/2
1/4
1/4
1/2R TYP
1.1/2
3/4
1.1/4
63/64
1/2
MAKE FROM MILD STEEL
ME 4310-338-15/5-12

Figure 5-12. Fabrication of interference test block; starting motor assembly.

Section IV. TROUBLESHOOTING

5-8. General

his section provides information useful in diagnos ng and correting unsatisfactory operation or failure f the Model 1M600RPV Rotary Air Compressor hat is beyond the scope of organizational mainte ance. Malfunctions which may occur are listed in Table 5-6. Each malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described opposite the probable cause. References to applicable procedural paragraphs or illustrations are also included in the corrective action column.

Table 5-6. Troubleshooting

Trouble	Probable cause	Corrective action
1. Engine will not turn over.	*a.* Engine internal seizure.	*a.* Overhaul engine to replace defective parts.
	b. Compressor internal seizure.	*b.* Overhaul compressor to replace defective parts.
	c. Starting motor or solenoid defective.	*c.* Replace or repair starting motor or solenoid (para 6-6).
2. Engine turns over but will not start or is hard to start.	*a.* Fuel priming pump defective.	*a.* Replace or repair fuel priming pump (para 6-15).
	b. Fuel transfer pump defective.	*b.* Replace or repair fuel transfer pump (para 6-14).
	c. Turbocharger defective.	*c.* Replace or repair turbocharter (para 6-12).
	d. Exhaust valves sticking or burned.	*d.* Replace or recondition valves and seats (para 6-27).
	e. Cylinder liner worn or cracked.	*e.* Replace or repair cylinder liner (para 6-45).
	f. Piston or connecting rod defective.	*f.* Replace defective piston or connecting rod (para 6-43).
	g. Piston rings worn or broken.	*g.* Replace piston rings (para 6-43).
	h. Slipping fuel injection pump drive.	*h.* The fuel injection pump is driven by the accessory drive gear through a tapered sleeve. If this sleeve is not tightened properly the accessory drive shaft will not rotate. Check this by removing the fuel transfer pump, cranking the engine, and observing through the pump mounting opening to see if the shaft rotates. If the shaft fails to rotate, remove

Table 5-6. *Troubleshooting* — Continued

Trouble	Probable cause	Corrective action
2. Engine turns over but will not start or is hard to start — continued.		the small cover from the front of the timing gear cover and tighten the accessory drive gear retaining nut. If tightening eliminates the slipping, time the fuel injection pump to the engine before starting.
	i. Engine timing incorrect.	*i.* Adjust accessory drive shaft timing (para 6-34).
3. Engine misses or runs erratically.	*a.* Fuel transfer pump defective.	*a.* Replace or repair fuel transfer pump (para 6-14).
	b. Valve clearances incorrect.	*b.* Adjust valve clearances (para 3-117).
	c. Defective fuel injection nozzle or fuel injection pump.	*c.* Run engine at speed where defect is most noticeable. Momentarily loosen fuel line nut on each injection pump, one at a time, to "cut out" that cylinder. If one is found where loosening nut makes no difference in irregular operation, replace nozzle or pump for that cylinder (para 3-94 and 3-93).
	d. Fuel rack setting incorrect.	*d.* Adjust fuel rack setting (para 6-17).
	e. Fuel injection pump timing incorrect.	*e.* Adjust fuel injection pump timing (para 6-20).
	f. Push rods bent or broken.	*f.* Replace defective push rods (para 6-27).
	g. Exhaust valves sticking or burned.	*g.* Replace or recondition exhaust valves (para 6-27).
	h. Cylinder liner worn or cracked.	*h.* Replace or repair defective liner (para 6-45).
	i. Piston or connecting rod defective.	*i.* Replace defective piston or connecting rod (para 6-43).
	j. Piston rings worn or broken.	*j.* Replace piston rings (para 6-43).
	k. Governor defective.	*k.* Repair or replace governor (para 6-17).
4. Engine lacks power.	*a.* Valve clearances incorrect.	*a.* Adjust valve clearances (para 3-117).
	b. Fuel transfer pump defective.	*b.* Replace or repair fuel transfer pump (para 6-14).
	c. Fuel rack setting incorrect.	*c.* Adjust fuel rack setting (para 6-17).
	d. Fuel injection pump timing incorrect.	*d.* Adjust fuel injection pump timing (para 6-20).

Table 5-6. Troubleshooting — Continued

Trouble	Probable cause	Corrective action
4. Engine lacks power — continued.	*e.* Defective fuel injection nozzle or fuel injection pump.	*e.* Run engine at speed where defect is most noticeable. Monetarily loosen fuel line nut on each injection pump, one at a time, to "cut out" that cylinder. If one is found where loosening nut makes no difference in irregular operation, replace nozzle or pump for that cylinder (para 3-94 and 3-93).
	f. Turbocharger carboned or otherwise dragging.	*f.* Repair or replace turbocharger (para 6-12).
	g. Cylinder liner worn or cracked.	*g.* Rplace or repair cylinder liner (para 6-45).
	h. Piston or connecting rod defective.	*h.* Replace defective piston or connecting rod (para 6-43).
	i. Piton rings worn or broken.	*i.* Replace piston rings (para 6-43).
	j. Exhaust valves sticking or burned.	*j.* Replace or recondition exhaust valves and seats (para 6-27).
	k. Governor assembly defective.	*k.* Repair or replace governor assembly (para 6-17).
5. Engine knocks, develops excessive noise, or vibration.	*a.* Crankshaft pulley or vibration damper defective.	*a.* Replace crankshaft pulley or vibration damper (para 6-36).
	b. Push rods bent or broken.	*b.* Replace defective push rod (para 6-27).
	c. Vlave clearances incorrect.	*c.* Adjust valve clearances (para 3-117).
	d. Piston pin loose.	*d.* Locate loose piston pin by deactivating injectors, one at a time, until noise stops. Replace defective piston pin and bushing (para 6-43).
	e. Cylinder liner worn or cracked.	*e.* Replace defective cylinder liner (para 6-45).
	f. Piston or connecting rod defective.	*f.* Replace defective piston or connecting rod (para 6-43).
	g. Connecting rod bearings worn or loose.	*g.* Replace defective connecting rod bearings (para 6-43).
	h. Main bearings worn.	*h.* Replace worn main bearings (para 6-39).

Table 5-6. Troubleshooting — Continued

Trouble	Probable cause	Corrective action
5. Engine knocks. develops excessive noise, or vibration. — continued.	*i.* Crankshaft worn, tapered, or out-of-round.	*i.* Recondition or replace crankshaft (para 6-39).
	j. Crankshaft and clearance excessive.	*j.* Replace crankshaft thrust washers (para 6-39).
	k. Flywheel loose.	*k.* Tighten flywheel attaching capscrews.
	l. Crankshaft vibration damper loose or defective.	*l.* Tighten or replace vibration damper (para 6-36).
6. Engine stops suddenly.	*a.* Engine seizure.	*a.* Overhaul engine and replace defective parts.
	b. Compressor seizure.	*b.* Overhaul compressor and replace defective parts.
	c. Engine overspeeds because of defective governor assembly. (Safety shutoff function.)	*c.* Repair or replace governor assembly (para 6-17).
7. Engine has low or no oil pressure.	*a.* Connecting rod bearings worn.	*a.* Replace defective connecting rod bearings (para 6-43).
	b. Oil pump defective.	*b.* Replace oil pump (para 6-30).
	c. Crankshaft worn excessively.	*c.* Recondition or replace crankshaft (para 6-39).
	d. Main bearings worn excessively.	*d.* Replace main bearings (para 6-39).
	e. Oil pump relief valve sticking.	*e.* Clean or replace relief valve (para 6-30).
	f. Fuel transfer pump drive shaft seals leaking. (Fuel leaking into lubricating oil.)	*f.* Replace or repair fuel transfer pump (para 6-14). Drain and refill crankcase in accordance with current Lubrication Order (LO) 5-4310-338-12.
	g. Camshaft bearings worn excessively.	*g.* Replace camshaft bearings (para 6-41).
	h. Rocker arm bore or rocker arm shaft worn excessively.	*h.* Replace derective rocker arm shaft and related parts (para 6-27).
	i. Timing gear bearing clearances excessive.	*i.* Inspect bearings and replace components as necessary (para 6-37).
	j. Engine oil cooler defective.	*j.* Clean, repair, or replace engine oil cooler (para 6-23).
	k. Engine oil filter defective.	*k.* Repair or replace engine oil filter (para 6-22).
8. Engine overheats.	*a.* Clogged coolant passages in cylinder block.	*a.* Clean cylinder block (para 6-45).

Table 5-6. Troubleshooting — Continued

Trouble	Probable cause	Corrective action
Engine overheats — continued.	*b.* Combustion gases in coolant.	*b.* Determine point at which gases are entering cooling system and repair.
	c. Water pump defective.	*c.* Repair or replace water pump (para 6-25).
	d. Fuel injection pump timing incorrect.	*d.* Adjust fuel injection pump timing (para 6-20).
	e. Cylinder block cracked.	*e.* Replace cylinder block (para 6-45).
Engine fails to stop.	*a.* Governor defective.	*a.* Repair or replace governor (para 6-17).
	b. Fuel rack broken or jammed.	*b.* Repair or replace fuel rack (para 6-17).
Excessive engine oil consumption.	*a.* Piston rings cracked or worn excessively.	*a* Replace piston rings (para 6-43).
	b. Cylinder liner worn excessively.	*b.* Replace cylinder liner (para 6-45).
	c. Oil cooler bypass valve defective.	*c.* Repair or replace oil cooler bypass valve (para 6-23).
	d. Oil cooler clogged or defective.	*d.* Clean or replace oil cooler (para 6-23).
	e. Valve guides worn excessively.	*e.* Recondition cylinder head assembly (para 6-27).
	f. Rocker arm shaft end plugs not in place.	*f.* Replace rocker arm shaft end plugs (para 6-27).
Engine exhaust excessively white or blue.	*a.* Valve guide wear excessive.	*a.* Recondition cylinder head assembly (para 6-27).
	b. Piston rings cracked or worn excessively.	*b.* Replace defective piston rings (para 6-43).
	c. Fuel injection pump timing incorrect.	*c.* Adjust fuel injection pump timing (para 6-20).
	d. Push rod bent or broken.	*d.* Replace bent or broken push rod (para 6-27).
	e. Exhaust valves not seating properly.	*e.* Replace or recondition valves or valve seats as required (para 6-27).
Engine exhaust excessively black or grey.	*a.* Fuel injection pump timing incorrect.	*a.* Adjust fuel injection pump timing (para 6-20).
	b. Exhaust valves not seating properly.	*b.* Replace or recondition valves or valve seats as required (para 6-27).
Valve clearances close-up.	Valves worn or out of adjustment.	Adjust valve clearances (para 3-117). If problen still exists, recondition cylinder head.
Coolant in engine lubricating oil.	*a.* Cylinder head gasket failure.	*a.* Replace head gasket (para 6-27). **NOTE** **Maintain proper torque on cylinder head capscrew.**
	b. Cylinder head cracked or defective.	*b.* Replace cylinder head (para 6-27).
	c. Cylinder block cracked or defective.	*c.* Replace cylinder block (para 6-45).
Premature engine wear.	Lubricating oil being diluted by fuel (probably accompanied by high fuel consumption and low engine oil pressure).	Replace leaking components.
Loud valve train noise.	*a.* Camshaft defective.	*a.* Replace all damaged parts (para 6-41). Clean engine thoroughly.
	b. Valve lifters broken or severely worn.	*b.* Replace camshaft (para 6-41) and valve lifters (para 6-27). Clean engine thoroughly. Adjust valve clearances (para 3-117).
Little rocker arm movement and excessive valve clearances.	*a.* Camshaft lobes severely worn.	*a.* Replace camshaft and followers (para (para 6-41). Clean engine thoroughly. Adjust valve clearances (para 3-117).
	b. Valve lifters severely worn or broken.	*b.* Replace valve lifters (para 6-27). Check camshaft for wear (para 6-41). Check for sticking valves and bent valve stems. Clean engine thoroughly. Adjust valve clearances (para 3-117).
	c. Valve tip worn excessively.	*c.* Replace worn valves (para 6-27).
	d. Valve lifter face worn excessively.	*d.* Replace defective valve lifter (para 6-27).

Table 5-6. Troubleshooting — Continued

Trouble	Probable cause	Corrective action
	e. Push rod worn excessively.	*e.* Replace defective push rod (para 6-27).
	f. Rocker arm anvil worn excessively.	*f.* Replace rocker arm (para 6-27).
18. Valve rotocoil or spring retainer free.	*a.* Keepers are broken.	*a.* Extensive engine damage may result from dropped valve. Replace all damaged parts.
	b. Valve spring broken.	*b.* Replace valve spring (para 6-27).
19. Engine slobber.	*a.* Valve guide worn excessively.	*a.* Recondition cylinder head assembly (para 6-27).
	b. Excessive lubricating oil in valve compartment.	*b.* Replace rocker arm shaft end plugs (para 6-27).
	c. Piston rings worn excessively.	*c.* Replace defective piston rings (para 6-43).
	d. Cylinder liners worn excessively.	*d.* Replace worn cylinder liners (para 6-45).
20. Valve train clicking noise.	Valve spring broken.	Replace valve spring (para 6-27) and all other damaged components.
21. Lubricating oil in coolant.	Head gasket failed.	Replace head gasket (para 6-27).
22. Mechanical knock.	*a.* Engine connecting rod bearing defective.	*a.* Replace connecting rod bearing (para 6-43). Inspect and replace connecting rod and crankshaft if necessary
	b. Timing gear train defective.	*b.* Repair timing gear train (para 6-37).
	c. Crankshaft defective.	*c.* Replace crankshaft (para 6-39).
23. Compressor overheats.	*a.* Oil separator element clogged.	*a.* Replace element (para 7-9).
	b. Oxidized oil (varnished).	*b.* Disassemble and clean compressor (para 7-11) and oil separator (para 7-8). Replace oil separator element (para 7-9).
	c. Blades damaged or stuck in rotor slots.	*c.* Disassemble compressor. Clean or replace blades as necessary (para 7-11).
24. Noisy compressor operation.	*a.* Rotor bearings defective.	*a.* Replace rotor bearings (para 7-11).
	b. Broken rotor blades.	*b.* Replace rotor blades (para 7-11).
25. Compressor not operating to full capacity or pressure.	*a.* Intake control defective.	*a.* Repair or replace intake control (para 7-11).
	b. Engine governor defective.	*b.* Repair or replace governor (para 6-17).
	c. Blades sticking in rotor.	*c.* Disassemble and clean compressor (para 7-11).
26. Compressor fails to load or unload.	*a.* Intake control defective.	*a.* Repair or replace intake control (para 7-11).
	b. Air pressure regulator defective.	*b.* Repair or replace air pressure regulator (para 7-6).
	c. Dirt buildup on intake control valve seat.	*c.* Clean intake control valve and seat (para 7-11).
27. Compressor vibrates and metallic noice in compressor.	*a.* Stuck or broken rotor blades.	*a.* Clean or replace rotor blades as necessary. Clean stator (para 7-11).
	b. Defective rotor bearings.	*b.* Replace rotor bearings (para 7-11).
	c. Damaged rotor or stator.	*c.* Replace damaged rotor or stator (para 7-11).
28. Excessive compressor oil consumption.	Damaged or defective oil separator element.	Replace element (para 7-9).
29. Brake will not apply.	Punctured diaphragm in service chamber.	Repair service chamber (para 8-2 or 8-3).
30. Brakes apply but braking is not adequate.	*a.* Brake linings are glazed.	*a.* Replace brake linings (para 8-4).
	b. Self-adjusting mechanism not operating properly (front brakes only).	*b.* Repair or replace self-adjusting mechanism (para 8-4).
31. Brakes apply too slowly.	*a.* Service chamber is leaking.	*a.* Repair or replace service chamber (para 8-2 or 8-3).
32. Brakes will not release.	*a.* Spring brake is defective.	*a.* Repair or replace spring brake (para 8-2).

Table 5-6. Troubleshooting — Continued

Trouble	Probable cause	Corrective action
32. Brake will not release — continued.	*b.* Broken wedge return spring in service chamber (rear brakes) or in wedge brake assembly.	*b.* Repair or replace service chamber (para 8-2). or wedge assembly (para 8-4).
33. Brakes release too slowly.	*a.* Shoe guide ledges are corroded.	*a.* Repair wedge brake (para 8-4).
	b. Wedge actuating mechanism in service chamber is binding.	*b.* Repair or replace service chamber (para 8-2 or 8-3).
	c. Weak or broken brake shoe-to-shoe springs.	*c.* Replace shoe-to-shoe springs (para 8-4).
	d. Weak wedge return spring in service chamber (rear brakes) or wedge brake assembly.	*d.* Repair or replace service chamber (para 8-2) or wedge assembly (para 8-4).
	e. Plungers corroded or frozen.	*e.* Repair wedge brake (para 8-4).
34. Brakes apply uneven or grab.	*a.* Wedge actuating mechanism in service chamber is binding.	*a.* Repair or replace service chamber (para 8-2 or 8-3).
	b. Distorted brake linings.	*b.* Replace brake linings. Repair wedge brake (para 8-4).
	c. Linings loose on brake shoes.	*c.* Replace brake linings. Repair wedge brake (para 8-4).

Section V. RADIO INTERFERENCE SUPPRESSION

5-9. General

Refer to TM 11-483 and Chapter 3 of this manual for definitions, purposes, sources and methods used to obtained proper radio suppression. Refer to paragraph 3-30 for instructions on replacing radio interference suppression components.

Section VI. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS AND AUXILIARIES

5-10. General

The major components covered in this section are the engine assembly, air compressor assembly, and compressor oil separator assembly.

5-11. Compressor Oil Separator Assembly

a. Removal.

(1) Remove air discharge connection, lines, and valves from oil separator assembly (para 3-80).

(2) Remove compressor air cleaner assembly (para 3-79).

(3) Remove housing components as necessary for removal of oil separator assembly (para 3-33).

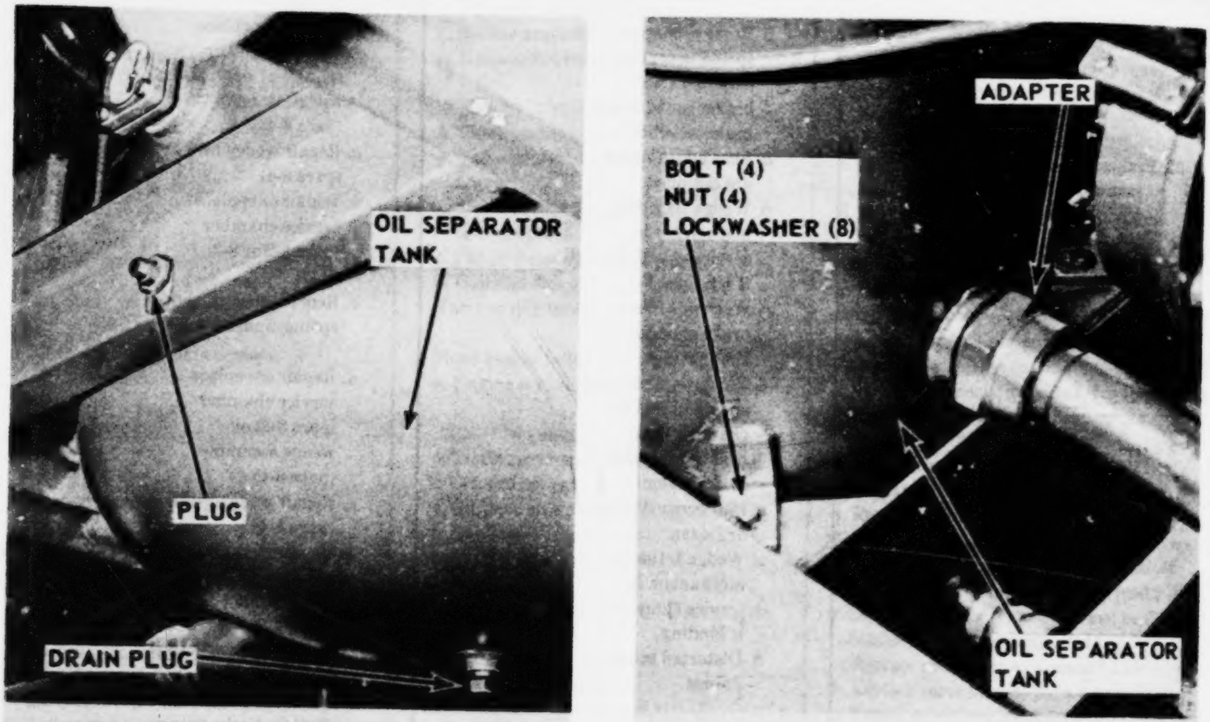
(4) Remove moisture separator assembly (para 3-90).

(5) Remove air pressure regulator assembly (para 3-89).

(6) Drain all oil from oil separator assembly (fig. 3-16).

(7) Remove all air lines, connections, and oil lines from oil separator assembly (para 3-81 and 3-86).

(8) Remove oil separator assembly as shown in figure 5-13.



ME 4310-338-15/5-13

REMOVAL

STEP 1. REMOVE PLUG FROM SIDE OF OIL SEPARATOR TANK.

STEP 2. REMOVE BOLTS, NUTS, AND LOCKWASHERS.

STEP 3. CONNECT LIFTING DEVICE TO TWO EYEBOLTS ON COVER AND REMOVE OIL SEPARATOR ASSEMBLY.

INSTALLATION

STEP 1. USING A LIFTING DEVICE, PLACE OIL SEPARATOR ASSEMBLY IN MOUNTING POSITION ON FRAME.

STEP 2. SECURE OIL SEPARATOR ASSEMBLY WITH BOLTS, NUTS, AND LOCKWASHERS.

STEP 3. INSTALL PLUG IN SIDE OF OIL SEPARATOR TANK.

Figure 5-13. Oil separator assembly; removal and installation.

b. Installation.

(1) Install oil separator assembly as shown in figure 5-13.

(2) Install all air lines, connections, and oil lines on oil separator assembly (para 3-81 and 3-86).

(3) Install air pressure regulator assembly (para 3-89).

(4) Install moisture separator assembly (para 3-90).

(5) Install housing components (para 3-33).

(6) Install compressor air cleaner assembly (para 3-79).

(7) Install air discharge connection, lines, and valves on oil separator assembly (para 3-80).

(8) Replenish compressor oil supply (fig. 3-16).

5-12. Air Compressor Assembly

a. Removal.

(1) Remove compressor oil separator assembly (para 5-11).

(2) Remove housing components as necessary for removal of air compressor assembly (para 3-33).

(3) Remove compressor oil filter assembly (para 3-87).

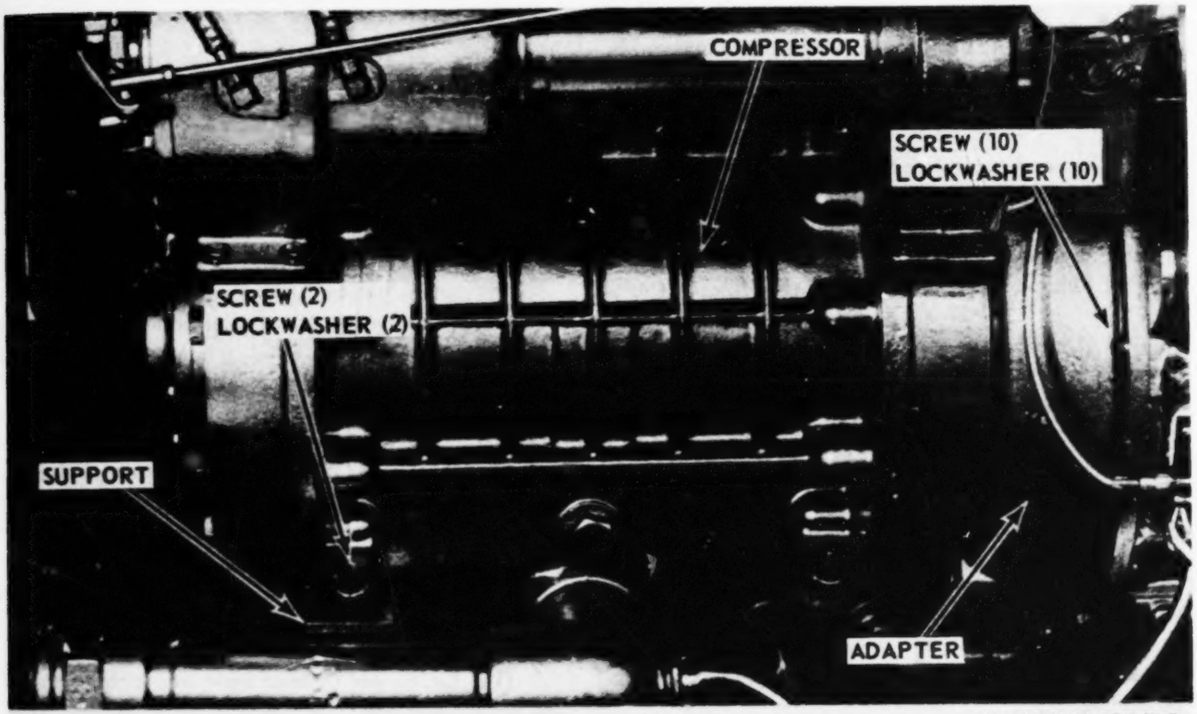
(4) Remove thermostatic switch (para 3-68).

(5) Remove discharge connection from base of air compressor (para 3-80).

(6) Remove air cleaner hose and all air lines from air compressor (para 3-81).

(7) Remove speed control linkage (para 3-88).

(8) Remove air compressor assembly as shown in figure 5-14.



ME 4310-338-15/5-14

REMOVAL

STEP 1. CONNECT LIFTING DEVICE TO EYEBOLTS.

STEP 2. REMOVE SCREWS AND LOCKWASHERS FROM COMPRESSOR SUPPORT.

STEP 3. REMOVE SCREWS AND LOCKWASHERS FROM ADAPTER. REMOVE COMPRESSOR BY PULLING STRAIGHT AWAY FROM ENGINE.

INSTALLATION

STEP 1. BE SURE BUSHINGS ARE PROPERLY INSTALLED ON COUPLING PINS.

STEP 2. USE LIFTING DEVICE AND INSTALL COMPRESSOR ONTO ENGINE. SECURE ADAPTER TO ENGINE WITH SCREWS AND LOCKWASHERS.

STEP 3. SECURE COMPRESSOR BASE TO SUPPORT WITH SCREWS AND LOCKWASHERS.

Figure 5-14. Air compressor assembly; removal and installation.

b. Installation.

(1) Install air compressor assembly as shown in figure 5-14.

(2) Install discharge connection to base of air compressor (para 3-80).

(3) Install thermostatic switch (para 3-68).

(4) Install speed control linkage (para 3-88).

(5) Install compressor oil filter assembly (para 3-87).

(6) Install compressor oil separator assembly (para 5-11).

(7) Install air cleaner hose and all air lines to air compressor (para 3-81).

(8) Install all housing components (para 3-33).

5-13. Engine Assembly

a. Removal.

(1) Remove housing components as necessary for removal of engine and air compressor (para 3-33).

(2) Remove fan guard assembly (para 3-70).

(3) Drain all coolant from radiator and engine block.

(4) Drain all oil from oil separator assembly (fig. 3-16).

(5) Remove radiator and oil cooler assembly (para 3-73).

(6) Remove fan assembly (para 3-74).

(7) Remove thermostatic switch (para 3-68).

(8) Remove air discharge connection from base of air compressor (para 3-80).

(9) Remove compressor oil filter assembly (para 3-87).

(10) Disconnect air cleaner hose and all air lines from air compressor (para 3-81).

(11) Remove air cleaner hose and tubing from turbocharger assembly (para 3-115).

(12) Disconnect battery cables from starting motor. Remove wiring harness from starting motor and fuel rack shutoff solenoid (fig. 1-3).

(13) Remove ground cable from battery. Disconnect generator regulator cables from generator assembly and ammeter (fig. 3-91).

(14) Disconnect fuel lines from primary fuel filter assembly, fuel bypass valve, and fuel priming pump (fig. 3-88).

(15) Drain fuel from primary and final fuel filter assemblies.

(16) Remove solenoid wiring harness (para 3-40).

(17) Remove instrument panel assembly (para 3-45).

(18) Remove overspeed governor switch, wires, and tachometer cables (para 3-67).

(19) Remove speed control linkage (para 3-88).

(20) Remove air compressor (para 5-12).

(21) Remove engine assembly as shown in figure 5-15.

b. Installation.

(1) Install engine assembly as shown in figure 5-15.

(2) Install air compressor (para 5-12).

(3) Install overspeed governor switch, wires, and tachometer cables (para 3-67).

(4) Install instrument panel assembly (para 3-45).

(5) Install solenoid wiring harness (para 3-40).

(6) Connect fuel lines to primary fuel filter assembly, fuel bypass valve, and fuel priming pump.

(7) Connect generator regulator cables to generator assembly and ammeter (fig. 1-3).

(8) Install wiring harness to starting motor and fuel rack shut-off solenoid. Connect battery cables to starting motor.

(9) Install speed control linkage (para 3-88).

(10) Install compressor oil filter assembly (para 3-87).

(11) Install air discharge connection on base of air compressor (para 3-80).

(12) Install thermostatic switch (para 3-68)

(13) Install fan assembly (para 3-74).

(14) Install radiator and oil cooler assembly (para 3-73).

(15) Install fan guard assembly (para 3-70).

(16) Install air cleaner hose and tubing to turbocharger assembly (para 3-115).

(17) Connect air cleaner hose and all air lines to air compressor (para 3-81).

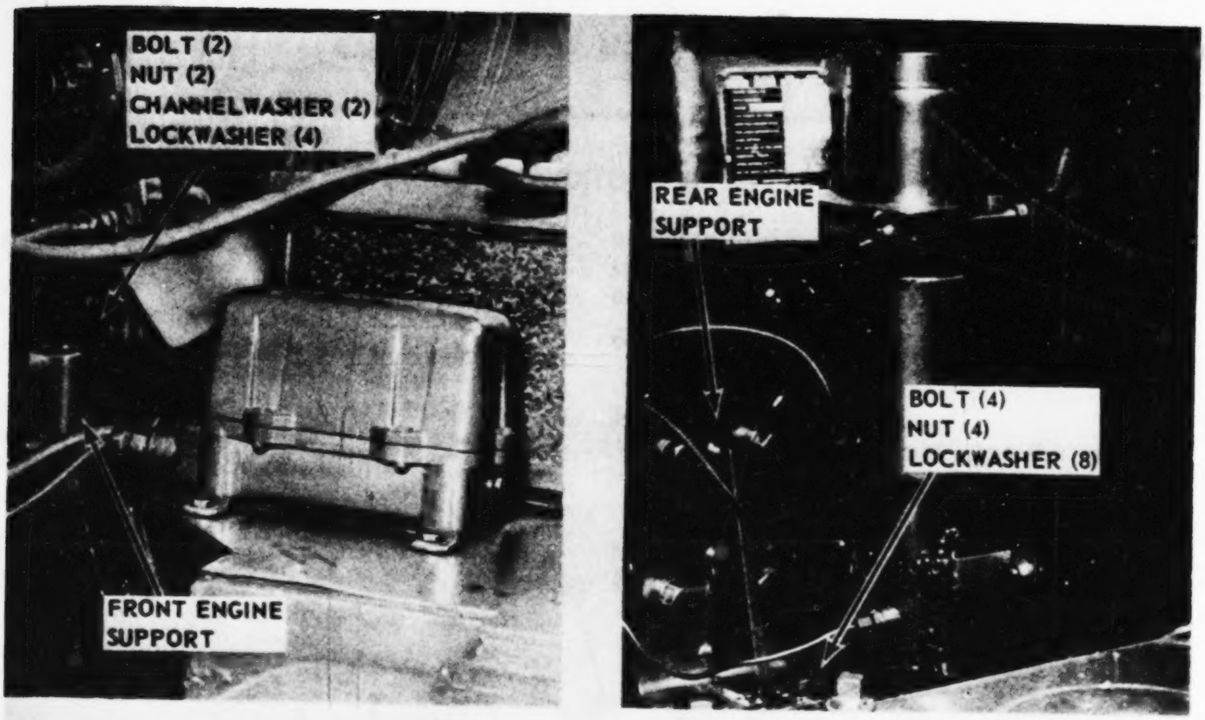
(18) Install all housing components (para 3-33).

(19) Replenish coolant in engine cooling system (fig. 3-9).

(20) Replenish compressor oil supply (fig. 3-16).

(21) Connect battery ground cable.

(22) Polarize generator assembly (para 3-102).


BOLT (2)
NUT (2)
CHANNELWASHER (2)
LOCKWASHER (4)
FRONT ENGINE SUPPORT
REAR ENGINE SUPPORT
BOLT (4)
NUT (4)
LOCKWASHER (8)
ME 4310-338-15 5-15

REMOVAL

STEP 1. CONNECT LIFTING DEVICE TO EYEBOLTS.

STEP 2. REMOVE BOLTS, NUTS, CHANNELWASHERS, AND LOCKWASHERS FROM FRONT SUPPORT.

STEP 3. REMOVE BOLTS, NUTS, AND LOCKWASHERS FROM REAR SUPPORT. LIFT ENGINE FROM FRAME.

INSTALLATION

STEP 1. USE LIFTING DEVICE AND POSITION ENGINE ON FRAME.

STEP 2. SECURE REAR SUPPORT WITH BOLTS, NUTS, AND LOCKWASHERS.

STEP 3. SECURE FRONT SUPPORT WITH BOLTS, NUTS, CHANNELWASHERS, AND LOCKWASHERS.

Figure 5-15. Engine; removal and installation.

CHAPTER 6
ENGINE REPAIR INSTRUCTIONS

Section I. GENERATOR ASSEMBLY

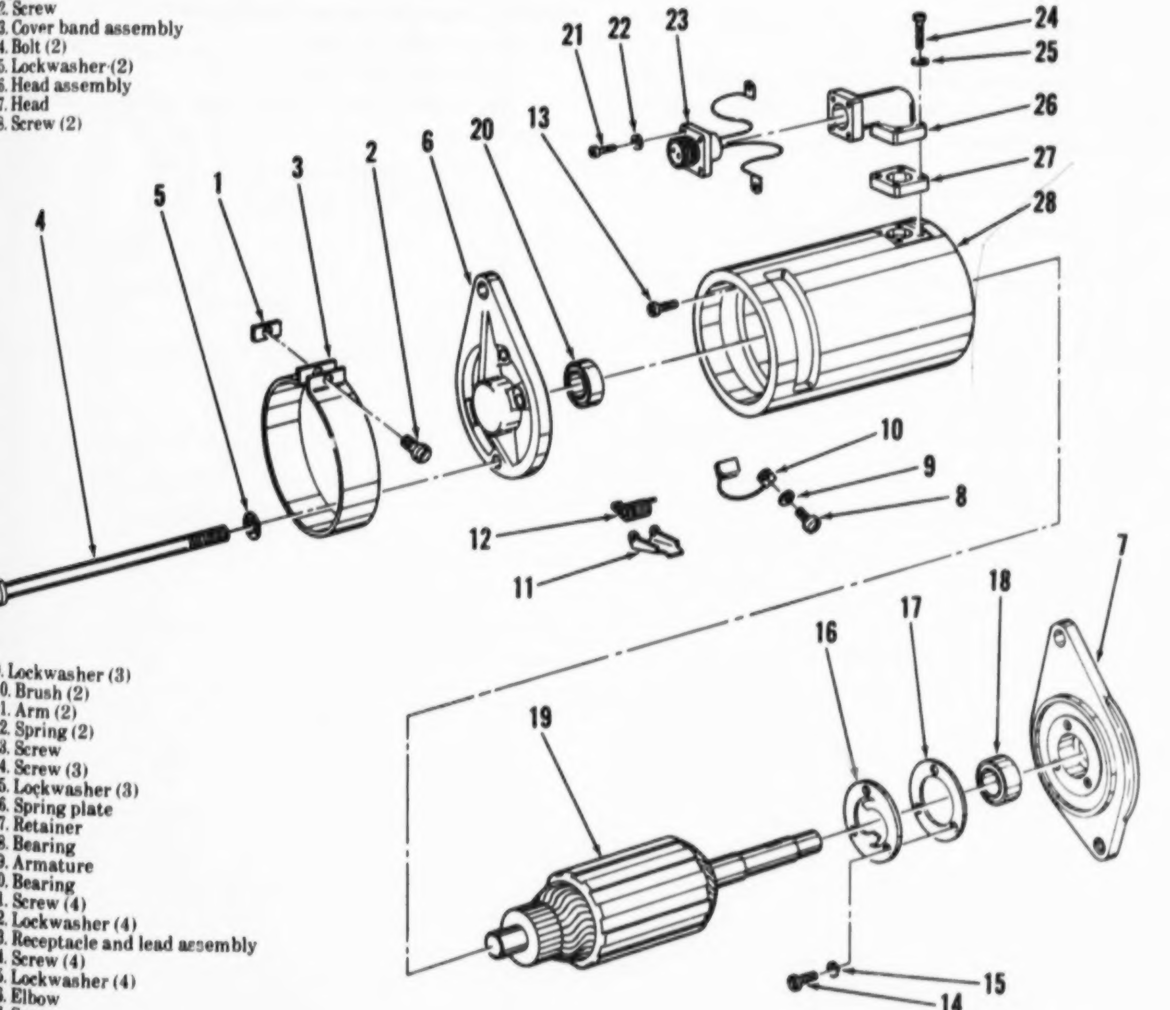
6-1. General

The engine generator is a 24-volt, two-pole, shunt-type unit with sealed ball bearings at both ends. The generator is driven by three V-belts off the engine crankshaft pulley. The generator supplies electrical energy to recharge the batteries and to fulfill the load requirements of the air compressor unit when the engine is running. The generated current is controlled and distributed by the generator regulator. The generator assembly is cooled by a fan mounted on the drive end of the generator.

6-2. Generator Assembly

a. Removal. Remove generator assembly (para 3-102).

b. Disassembly. Disassemble generator assembly in numerical sequence shown in figure 6-1.



1. Nut
2. Screw
3. Cover band assembly
4. Bolt (2)
5. Lockwasher (2)
6. Head assembly
7. Head
8. Screw (2)

. Lockwasher (3)
0. Brush (2)
1. Arm (2)
2. Spring (2)
3. Screw
4. Screw (3)
5. Lockwasher (3)
6. Spring plate
7. Retainer
8. Bearing
9. Armature
0. Bearing
1. Screw (4)
2. Lockwasher (4)
3. Receptacle and lead assembly
. Screw (4)
. Lockwasher (4)
. Elbow
. Spacer
. Frame and field assembly

Figure 6-1. Generator assembly; disassembly and reassembly.

ME 4310-338-15/6-1

c. Cleaning, Inspection, and Repair.

NOTE

Refer to TM 5-764 for general repair instructions.

CAUTION

Do not soak or clean, with solvent, any insulation, or electrical components such as brushes and field coils.

(1) Clean housing and end covers using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Clean internal parts with clean, dry, compressed air.

(3) Inspect brushes for cracks, chips, or excessive wear.

(4) Inspect brush springs and arms for distortion, cracks, breaks, or wear.

(5) Inspect head and head assembly for cracks, breaks, or warpage. If defective, replace entire generator assembly.

(6) Inspect bearings for wear, scoring, or pitting. Check for freedom of rotation.

(7) Inspect armature windings to see if they are properly pressed in core slots and tightly soldered to commutator risers.

(8) Inspect commutator for rough spots, discoloration, pitting, scoring, and high mica. If commutator is rough, pitted, or worn, turn commutator using a lathe. Take cuts until all pits are removed. Remove all burrs by holding No. 00 sandpaper lightly against commutator while armature is turning in lathe. Undercut mica after turning commutator. The mica must be undercut to a depth of 1/32" to 3/64".

(9) Inspect commutator for out-of-round using a dial indicator. Out-of-round shall not exceed 0.001" T.I.R.

(10) Inspect bearing journals on both ends of armature shaft for wear, scoring, or pitting. If armature is defective, replace entire generator assembly.

(11) Inspect all other parts for excessive wear cracks, breaks, or any other defect.

(12) Inspect attaching hardware for damaged threads, distortion, or any other defect.

d. Preassembly Testing.

(1) *Current Draw Test.*

(*a*) Make current draw test setup as shown in figure 6-2.

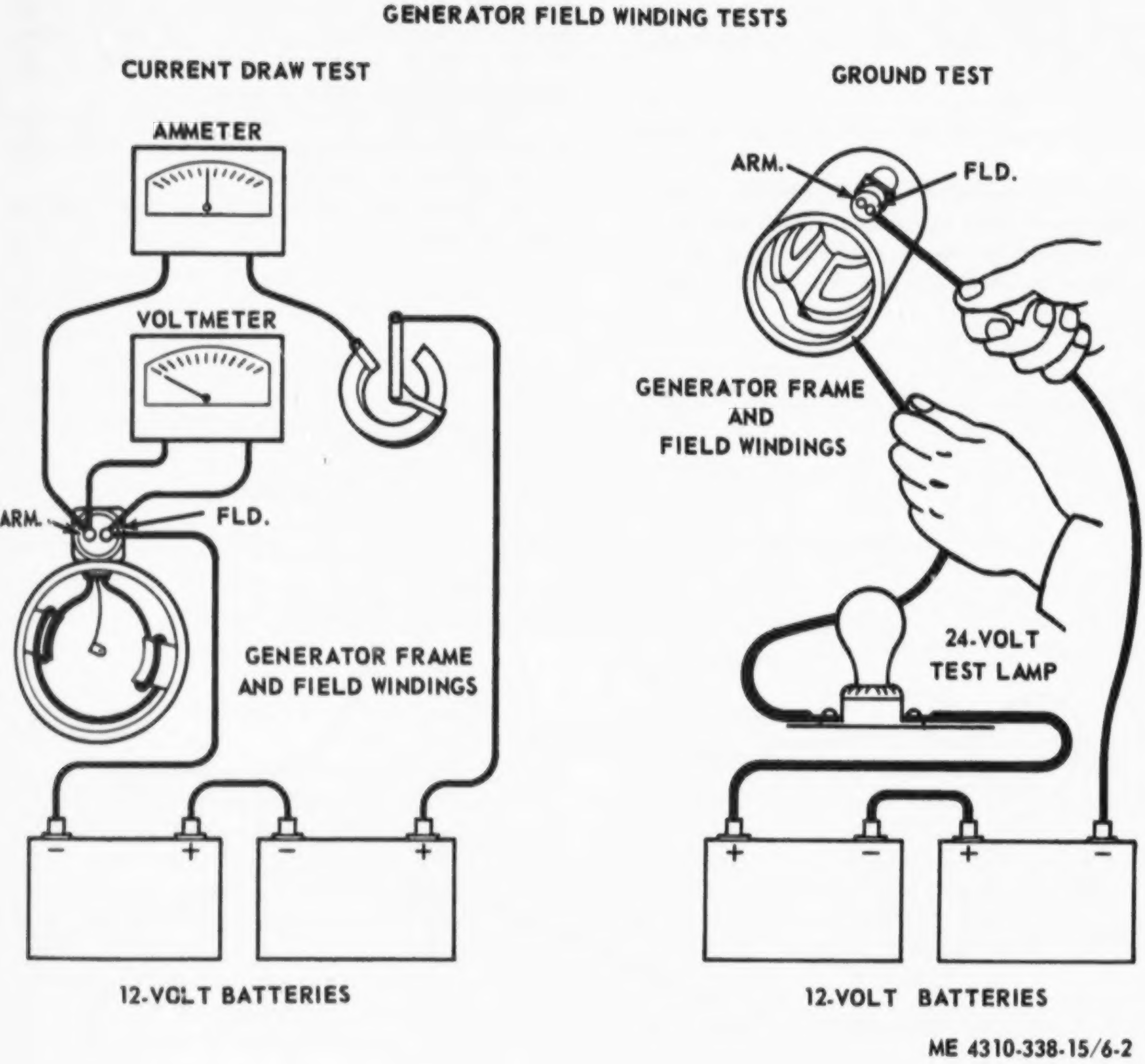

GENERATOR FIELD WINDING TESTS
CURRENT DRAW TEST
AMMETER
VOLTMETER
ARM.
FLD.
GENERATOR FRAME AND FIELD WINDINGS
12-VOLT BATTERIES
GROUND TEST
ARM.
FLD.
GENERATOR FRAME AND FIELD WINDINGS
24-VOLT TEST LAMP
12-VOLT BATTERIES
ME 4310-338-15/6-2

Figure 6-2. Generator preassembly test setups.

(*b*) Adjust rheostat to obtain a voltmeter reading of 28.5 volts. Normal field coil draw should be 1.07 to 1.27 amperes (70 F.). If current is not within specifications, field coils are defective and should be replaced.

(2) *Ground Test.*

(*a*) Make ground test setup as shown in figure 6-2.

(*b*) Check armature for grounds by touching shaft with one probe and each commutator bar, in turn, with other probe. If lamp lights on any one commutator bar, armature is defective and must be replaced.

(*c*) Check for grounds between field windings and generator frame by touching frame with one probe and each terminal, in turn, with other probe. If lamp lights, field coil being checked is defective and must be replaced.

e. Reassembly. Reassemble generator assembly in reverse numerical sequence shown in figure 6-1.

f. Motoring and Output Test.

(1) Make motoring and output test setup as shown in figure 6-3.

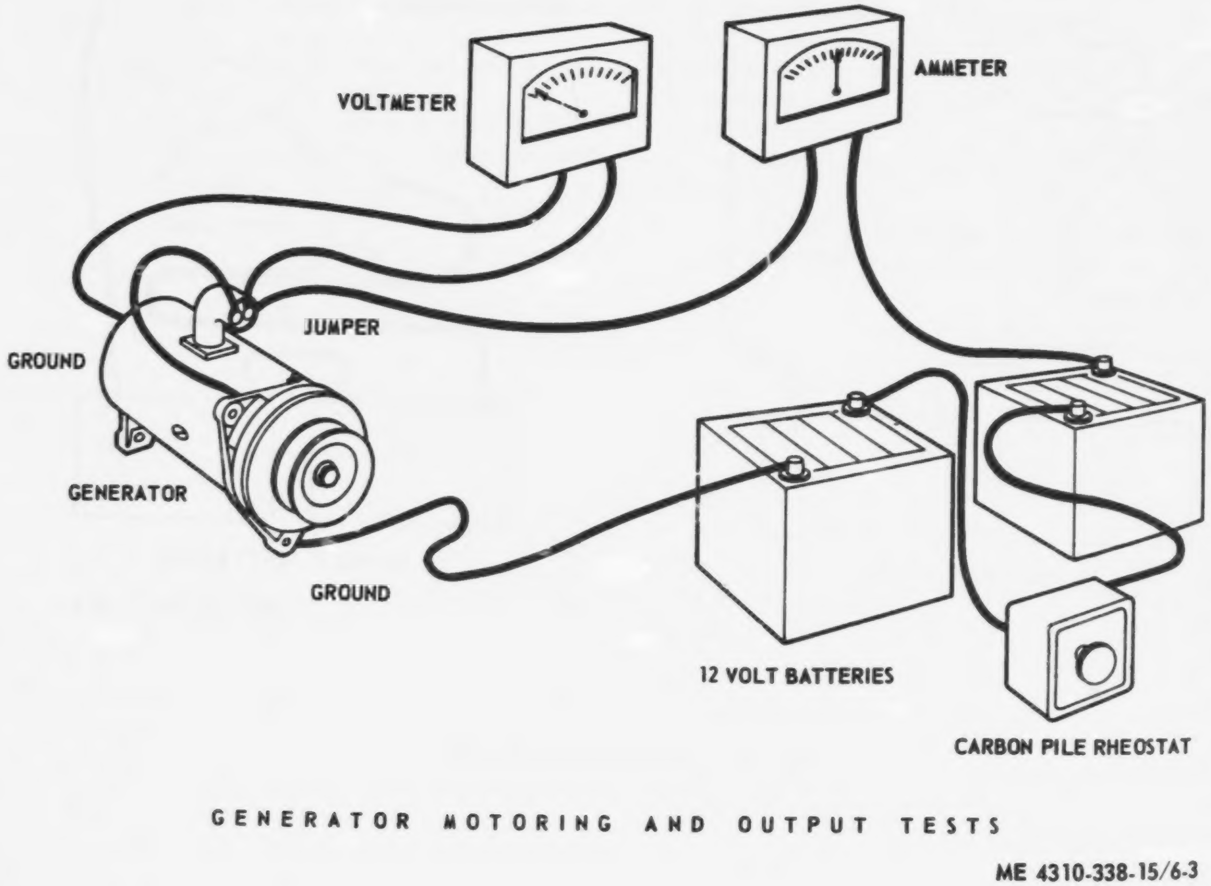

VOLTMETER
AMMETER
JUMPER
GROUND
GENERATOR
GROUND
12 VOLT BATTERIES
CARBON PILE RHEOSTAT
GENERATOR MOTORING AND OUTPUT TESTS
ME 4310-338-15/6-3

Figure 6-3. Generator assembly operational test setup.

(2) Adjust rheostat to obtain a voltmeter reading of 28.5 volts. Normal current draw, as shown on the ammeter, should be 3.5 amperes maximum. Listed below are three abnormal conditions which may occur and the probable cause for each.

(*a*) *Low motoring current.* Check for an open winding in the armature or for high resistance at the internal connections and in the brush contact on the commutator. An open armature can be detected because one spot on the commutator will be burned by the arc which is formed every time the open passes under a brush. The most likely causes of high resistance are worn brushes and a dirty or worn commutator.

(*b*) *High motoring current with armature not turning.* This condition indicates that the armature may be grounded or shorted. This condition may also be due to some restriction preventing the armature from rotating. Check the latter possibility by turning the armature by hand to make sure it turns easily with only a slight brush drag. If the armature does not turn easily, it indicates worn or dirty bearings, faulty or excessively worn brushes, insufficient end play, or foreign matter rubbing on the armature or fan.

(*c*) *High motoring current with armature turning.* This is usually caused by excessive drag on the armature. This drag may be due to worn or improperly lubricated bearings, improper end play, loose or misaligned bearings, high brush tension, worn or rough commutator, or to some other interference with armature movement.

g. Installation. Install generator assembly (para 3-102).

Section II. GENERATOR REGULATOR ASSEMBLY

6-3. General

Basically, the generator regulator assembly consists of relays, capacitors, resistors, a diode and the associated wiring. This circuitry is divided into three independent sections, each of which has a specific function in the charging circuit. The three sections are the circuit breaker, voltage regulator and current regulator. The function of each circuit is as follows:

a. Circuit Breaker. The function of the circuit breaker in the charging circuit is to automatically open and close the circuit between the generator and battery.

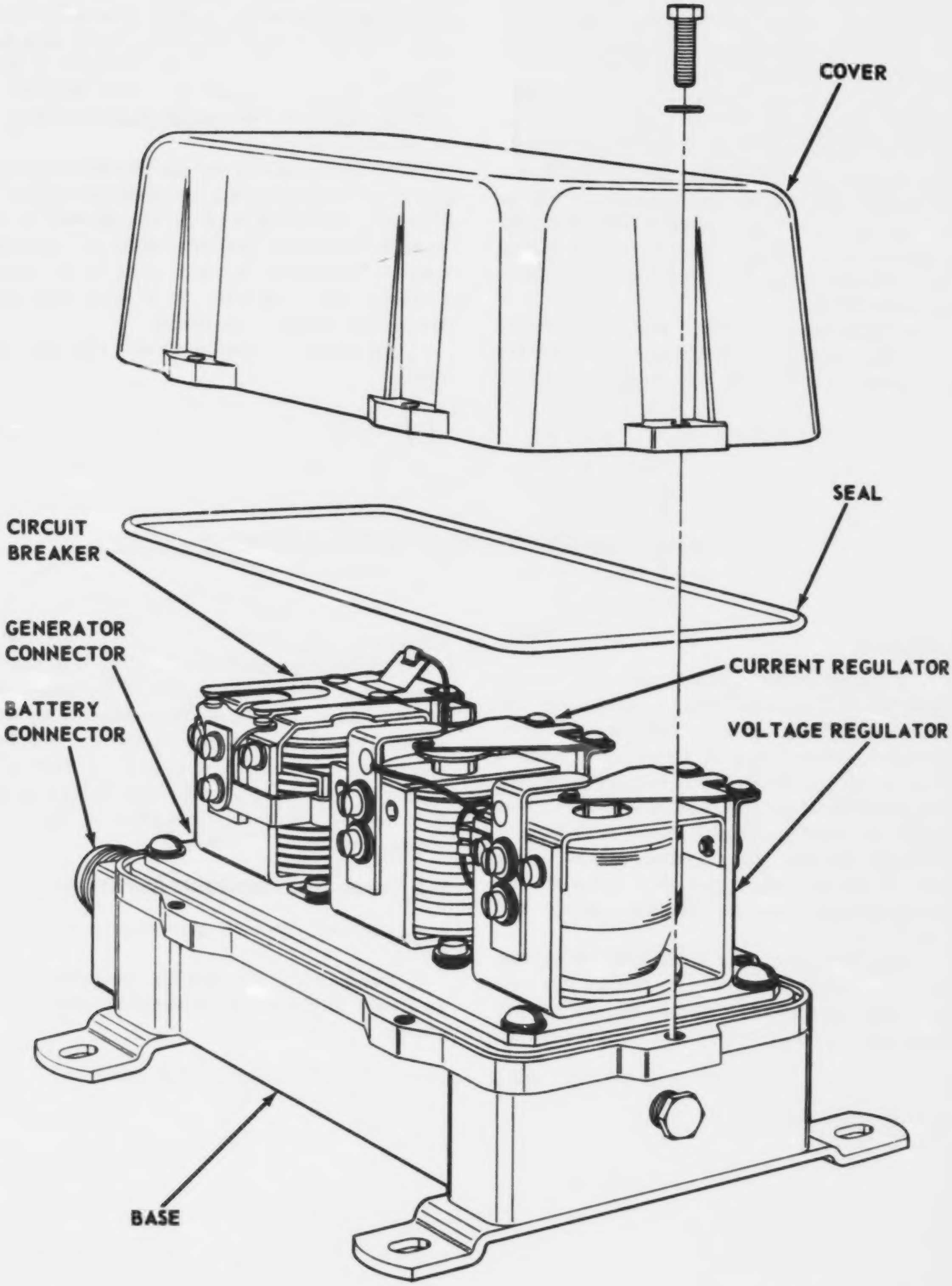
b. Voltage Regulator. The function of the voltage regulator is to limit the generator voltage to a safe value. This prevents overcharging of the battery and high system voltage which could damage electrical components.

c. Current Regulator. The function of the current regulator is to limit the output of the generator to its maximum safe value. This prevents generator overheating when the battery is low and will accept more than rated generator output, or when a high accessory load is imposed on the electrical system. This section operates independent of the voltage regulator unit.

6-4. Generator Regulator Assembly

a. Removal. Remove generator regulator (para 3-104).

b. Disassembly. Disassemble generator regulator as shown in figure 6-4. Disassemble only to extent shown.


COVER
SEAL
CIRCUIT BREAKER
GENERATOR CONNECTOR
BATTERY CONNECTOR
CURRENT REGULATOR
VOLTAGE REGULATOR
BASE

ME 4310-338-15/6-4

Figure 6-4. Generator regulator assembly; disassembly and reassembly.

c. Cleaning, Inspection, and Repair.

CAUTION

Do not soak or clean, with solvent, any insulating or electrical components such as capacitors, resistors, and coils.

(1) Clean cover and base using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Clean relay contact points using a strip of ordinary blank bond paper. Hold paper strip between fingers and slide paper back and forth between contact points.

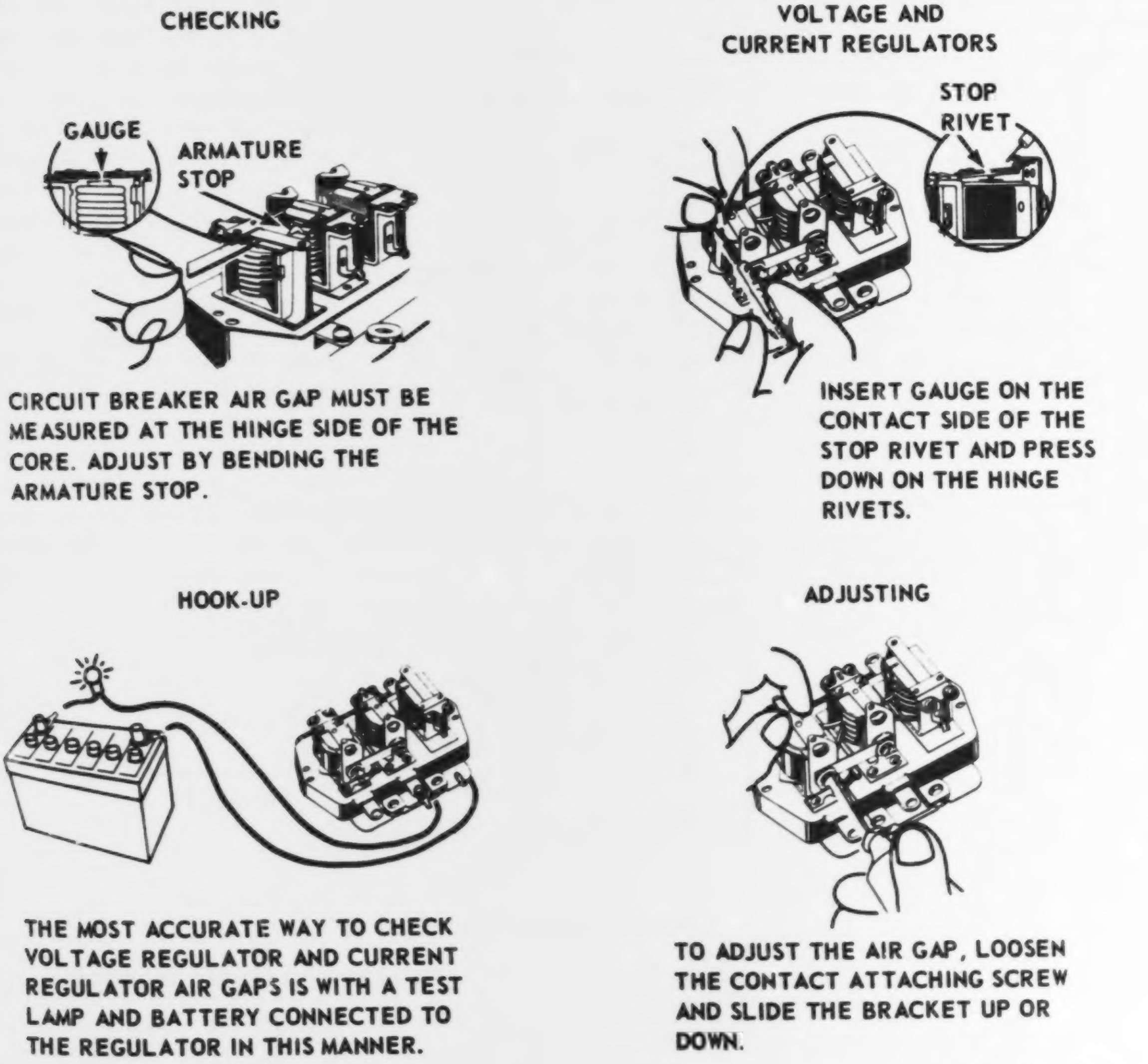
(3) Inspect relay contact points for burning, pitting, or excessive wear.

(4) Inspect all soldered connections.

(5) Inspect all other parts for any noticeable defects.

(6) Inspect attaching hardware for damaged threads, distortion, or any other defect.

d. Bench Testing and Adjustment (fig. 6-5).



CHECKING

CIRCUIT BREAKER AIR GAP MUST BE MEASURED AT THE HINGE SIDE OF THE CORE. ADJUST BY BENDING THE ARMATURE STOP.

VOLTAGE AND CURRENT REGULATORS

INSERT GAUGE ON THE CONTACT SIDE OF THE STOP RIVET AND PRESS DOWN ON THE HINGE RIVETS.

HOOK-UP

THE MOST ACCURATE WAY TO CHECK VOLTAGE REGULATOR AND CURRENT REGULATOR AIR GAPS IS WITH A TEST LAMP AND BATTERY CONNECTED TO THE REGULATOR IN THIS MANNER.

ADJUSTING

TO ADJUST THE AIR GAP, LOOSEN THE CONTACT ATTACHING SCREW AND SLIDE THE BRACKET UP OR DOWN.

ME 4310-338-15/6-5

Figure 6-5. Generator regulator assembly bench test setup.

(1) Check circuit breaker armature air gap. Measure from contact side of brass armature stop pin. This measurement should be 0.066" to 0.070". If measurement is not correct, bend armature stop to bring gap within acceptable limits.

(2) Check circuit breaker contact gap. This meas-

urement should be 0.047" minimum. When armature is down against core stop, contact spring must be lifted off contact support 0.015" minimum. Adjust these measurements, as required, by moving lower contact bracket. Keep both contacts aligned so that they make and break at same time.

(3) Check current regulator armature air gap. This measurement should be 0.057" to 0.060". Contacts must be open with 0.057" gage in place and closed with 0.060" gage in place on contact side and next to armature stop. If measurement is not correct, adjust by moving upper contact bracket. Keep contacts aligned.

(4) Check voltage regulator armature air gap. This measurement should be 0.057" to 0.060". Contacts must be open with 0.057" gage in place and closed with 0.060" gage in place on contact side and next to armature stop. If measurement is not correct, adjust by moving upper contact bracket. Keep contacts aligned.

(5) Install cover on generator regulator (fig. 6-4).

e. Installation. Install generator regulator (para 3-104).

f. Operational Testing and Adjustment. The following tests and adjustments are performed with generator regulator installed on air compressor unit. See figure 6-6.

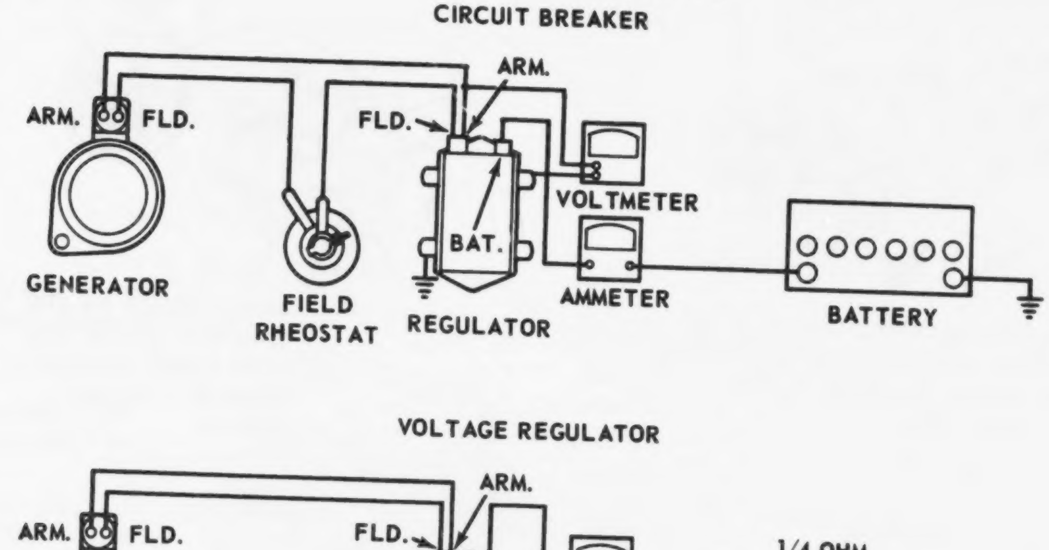

CIRCUIT BREAKER
ARM.
ARM.
FLD.
FLD.
GENERATOR
FIELD
RHEOSTAT
REGULATOR
BAT.
VOLTMETER
AMMETER
BATTERY
VOLTAGE REGULATOR
ARM.
ARM.
FLD.
FLD.
GENERATOR
BAT.
REGULATOR
VOLTMETER
1/4 OHM
FIXED RESISTOR
AMMETER
BATTERY
CURRENT REGULATOR
ARM.
ARM.
FLD.
FLD.
CARBON PILE LOAD RHEOSTAT
GENERATOR
BAT.
REGULATOR
VOLTMETER
AMMETER
BATTERY

Figure 6-6. Generator regulator assembly operational test setup.

ME 4310-338-15/6-6

(1) *Circuit breaker test and adjustment.*

(a) Make test setup connections as illustrated. The field rheostat is a three-ampere, 50-ohm, variable type.

(b) Start engine (para 2-9). Allow equipment to reach operating temperatures.

(c) Open air discharge valve to point where engine is running steady and generator assembly is rotating at 1500-2000 RPM. Use a friction type tachometer held against generator pulley to determine generator RPM

(d) Adjust field rheostat to obtain maximum resistance, then slowly reduce resistance and observe voltage reading just as circuit breaker closes. The voltmeter gives a sharp fluctuation and a slight click can be heard as contacts close. The closing voltage should be 25.5 to 26.5 volts. If voltage is not within acceptable limits, remove regulator cover and change armature spring tension by bending lower spring hanger. Increase spring tension to raise closing voltage and vice versa. Repeat test to ensure a proper adjustment has been made.

(e) Adjust field rheostat to increase resistance and note reverse current reading on ammeter just before contacts open. The current reading should be 4.2 to 6.2 amperes at 25.6 volts, after a charge of 9.0 amperes through windings. If current is not within acceptable limits, raise or lower stationary contact while keeping contact surfaces aligned. Do not decrease contact gap to less than 0.047". Repeat test to ensure a proper adjustment has been made.

(2) *Voltage regulator test and adjustment.*

(a) Change test setup to that illustrated. Reinstall regulator cover.

(b) Use air discharge valve and increase engine speed to obtain approximately 10-ampere charging rate as indicated on ammeter. Operate engine at this level for 15 minutes.

(c) After 15 minutes, stop engine (fig. 2-9), then restart it to cycle generator and obtain 10-ampere charging rate again. Note volt-meter reading. Reading should be 27.5 to 28.5 volts at all ambient temperatures from 50° F. to 100°F. If voltage is not within acceptable limits, remove cover and change armature spring tension by bending lower spring hanger. Increase spring tension to raise voltage and vice versa. After each adjustment, stop and restart engine and replace cover before taking voltage reading.

(3) *Current regulator test and adjustment.*

(a) Change test setup to that illustrated.

(b) Using air discharge valve, manually set engine at a speed which obtains a generator rotation of approximately 3000 RPM. Use a friction type tachometer held against generator pulley to determine generator RPM.

(c) Adjust carbon pile to obtain maximum amperage indication on ammeter. Amperage reading should be 18 amperes ±1 ampere. If current is not within acceptable limits, remove regulator cover and change armature spring tension by bending lower spring hanger. Increase spring tension to raise operating amperes and vice versa. Repeat test to ensure a proper adjustment has been made. Install generator regulator cover.

Section III. STARTING MOTOR ASSEMBLY

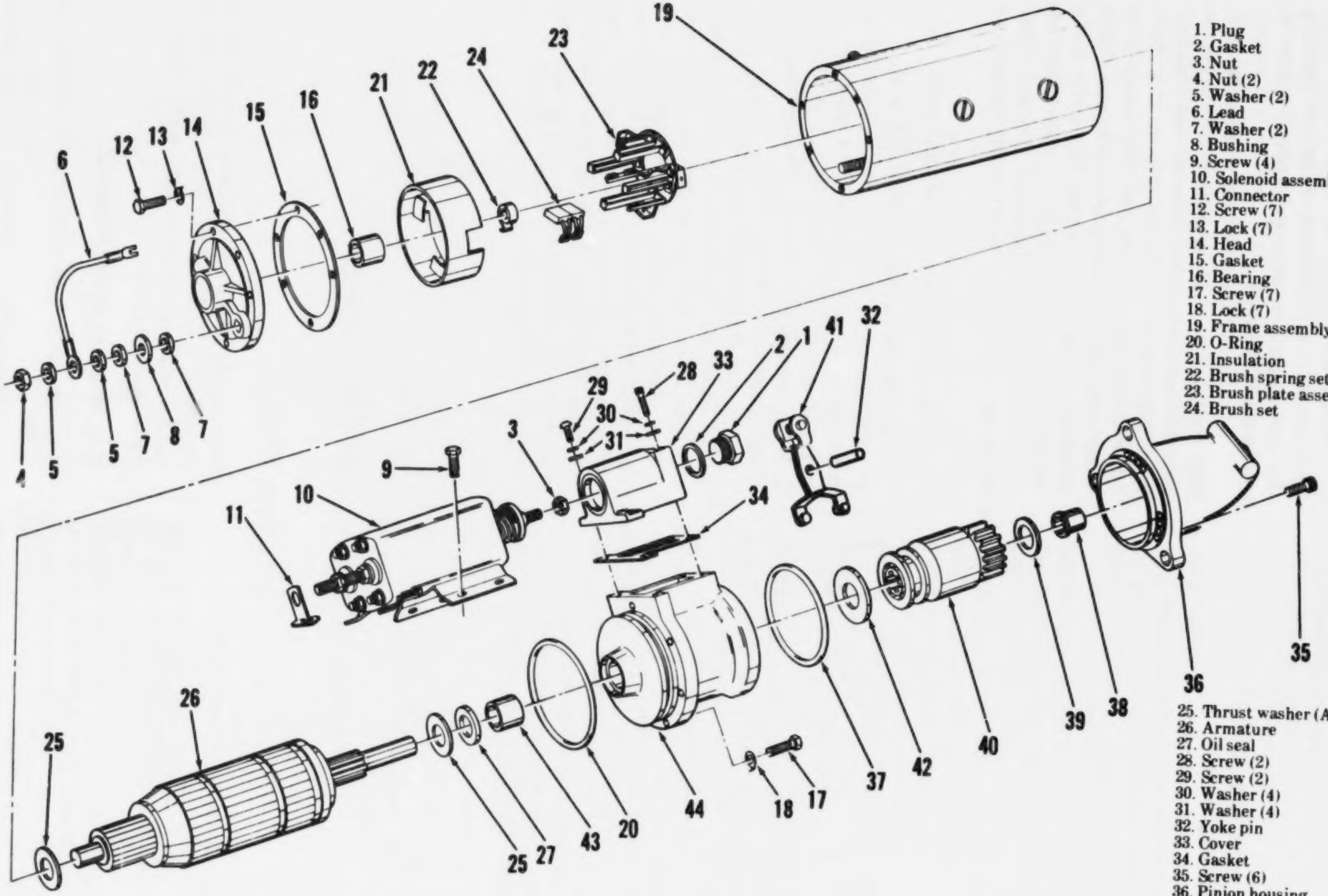
6-5. General

The starting motor converts electrical energy from the batteries into mechanical energy to turn the engine over for starting. The starting motor is a heavy-duty type that is completely sealed with gaskets, O-rings, and an oil seal. The solenoid is mounted on the outside of the frame with the solenoid plunger and pinion shifting mechanism totally enclosed. The drive assembly is an indexing type which assures complete drive pinion engagement before the motor begins to rotate. When the engine starts, the clutch releases and allows the pinion to turn faster than the armature shaft until the start switch is released and the return spring action retracts the pinion from the flywheel ring gear.

6-6. Starting Motor Assembly

a. Removal. Remove starting motor assembly (para 3-105).

b. Disassembly. Disassemble starting motor in numerical sequence shown in figure 6-7. Discard gaskets and O-rings.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1. Plug
2. Gasket
3. Nut
4. Nut (2)
5. Washer (2)
6. Lead
7. Washer (2)
8. Bushing
9. Screw (4)
10. Solenoid assembly
11. Connector
12. Screw (7)
13. Lock (7)
14. Head
15. Gasket
16. Bearing
17. Screw (7)
18. Lock (7)
19. Frame assembly
20. O-Ring
21. Insulation
22. Brush spring set
23. Brush plate assembly
24. Brush set
25. Thrust washer (A/R)
26. Armature
27. Oil seal
28. Screw (2)
29. Screw (2)
30. Washer (4)
31. Washer (4)
32. Yoke pin
33. Cover
34. Gasket
35. Screw (6)
36. Pinion housing
37. O-Ring
38. Bearing
39. Thrust washer (A/R)
40. Drive assembly
41. Yoke assembly
42. Thrust washer (A/R)
43. Bearing
44. Housing

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Figure 6-7. Starting motor assembly; disassembly and reassembly.

c. Cleaning, Inspection, and Repair.

CAUTION

Do not soak or clean, with solvent, any insulating or electrical components such as brushes and coils.

NOTE

Refer to TM 5-764 for general repair instructions.

(1) Clean housings and end covers using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Clean internal parts using dry compressed air.

(3) Inspect brushes for cracks, chips, excessive wear, or any other defect.

(4) Inspect bearings for wear, scoring, pitting, or any other defect. Check for freedom of rotation.

(5) Inspect brush springs and arms for distortion, cracks, breaks, excessive wear, or any other defect.

(6) Inspect commutator for rough spots, discoloration, pitting, scoring, and high mica. If commutator is rough, pitted, or worn, turn commutator using a lathe. Take light cuts until all pits are removed. Remove all burrs by holding No. 00 sandpaper lightly against commutator while armature is turning in lathe. Undercut mica after turning commutator. The mica must be undercut to a depth of 1/32".

(7) Inspect commutator for out-of-round using a dial indicator. Out-of-round shall not exceed 0.001" T.I.R.

(8) Inspect armature shaft for pitting, scoring, or excessive wear. Inspect drive assembly for broken teeth on pinion. Check to see that clutch assembly moves on shaft and that pinion spring compresses. Slide drive assembly on armature shaft to see if splines fit properly.

(9) Inspect solenoid parts. Check condition of moving core and sealing boot. Replace boot if cracked or brittle. Check contact assembly and terminal studs to see if they are burned, eroded, or pitted excessively.

(10) Inspect all other parts for cracks, breaks, excessive wear or any other defect.

(11) Inspect all attaching hardware for damaged threads, distortion, or any other defect.

d. Testing. Refer to TM 5-764 and test armature and field coils for shorts, open circuits, and grounds.

e. Reassembly. Reassemble starting motor in reverse numerical sequence shown in figure 6-7. Install new gaskets and O-rings.

(1) When installing new bearings, always use proper bearing arbor to obtain a proper fit. Remove felt wick in pinion housing reservoir before installing a new bearing. After new bearing installation, saturate felt wicks with SAE 20 oil, install wicks in reservoirs and fill reservoirs with SAE 20 oil.

(2) All O-rings should be lubricated with a film of light grease to prevent damage during reassembly.

(3) Lubricate armature bearing surfaces on shaft with SAE 10 oil. Lubricate shaft and splines under drive assembly with grease that conforms to Military Specification MIL-G-23827A.

(4) When assembling intermediate and pinion housings, tighten hex head screws to a torque value of eight foot-pounds.

(5) After assembly, the insulation on both terminal studs should be coated with glytal sealant. Keep sealant off of contact surfaces of terminal studs and nuts.

f. Bench Testing and Adjustment (fig. 6-8).

(1) *No load test.*

(*a*) Make no load current test setup as shown in view A.

(*b*) No load draw should be 22.0 volts, 90 amperes (maximum) at 7000 RPM minimum.

(*c*) If current is too high, check bearing alignment end play. Two or three sharp raps with a rawhide hammer shile motoring will often help align bearings and free armature.

(2) *Solenoid winding test.*

(*a*) Make solenoid winding test setup as shown in view B.

(*b*) Test current draw and make ground and open test on winding. Series winding values at 70 F. should be 23.2 to 26.6 amperes at 12.0 volts. Shunt winding values at 70 F. should be 4.1 to 4.8 amperes at 12.0 volts.

(3) *Stall torque test.*

(*a*) Make stall torque test setup as shown in view C.

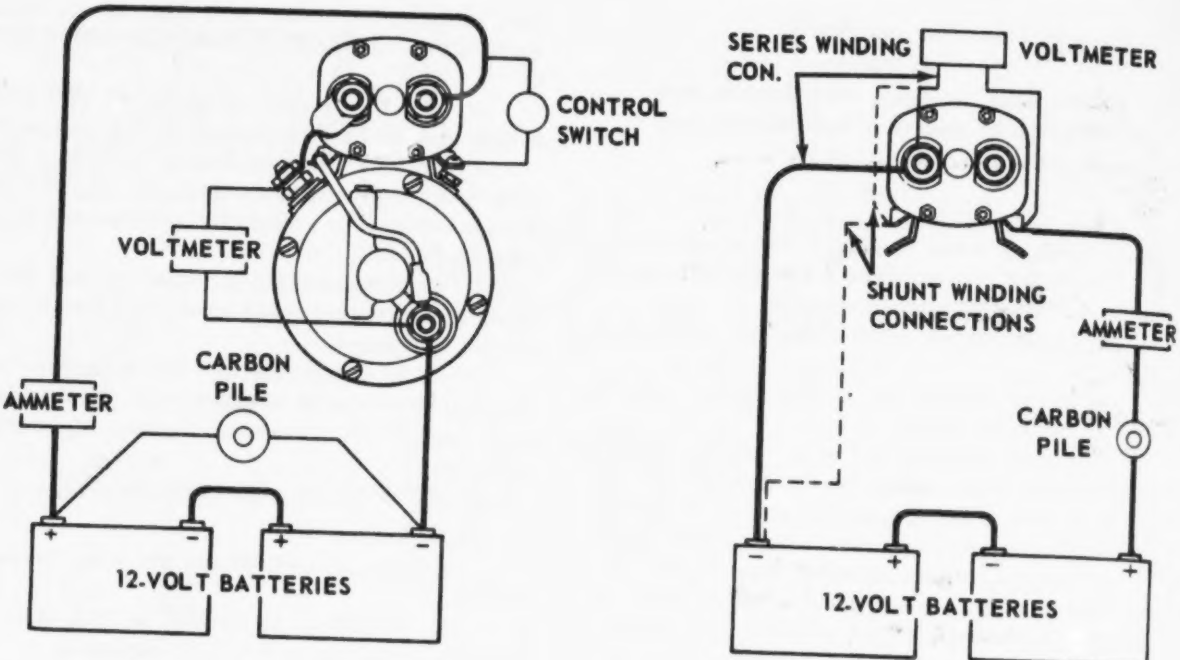
(*b*) The solenoid winding shall be activated with a separate battery.

(*c*) Stall torque test values should be 4.0 volts, 400 amperes (maximum), and 22.0 foot-pounds (minimum).

(*d*) If torque is too low, check armature, brush spring tension, contact area, and switch contacts. If these components are not at fault, replace entire starting motor.

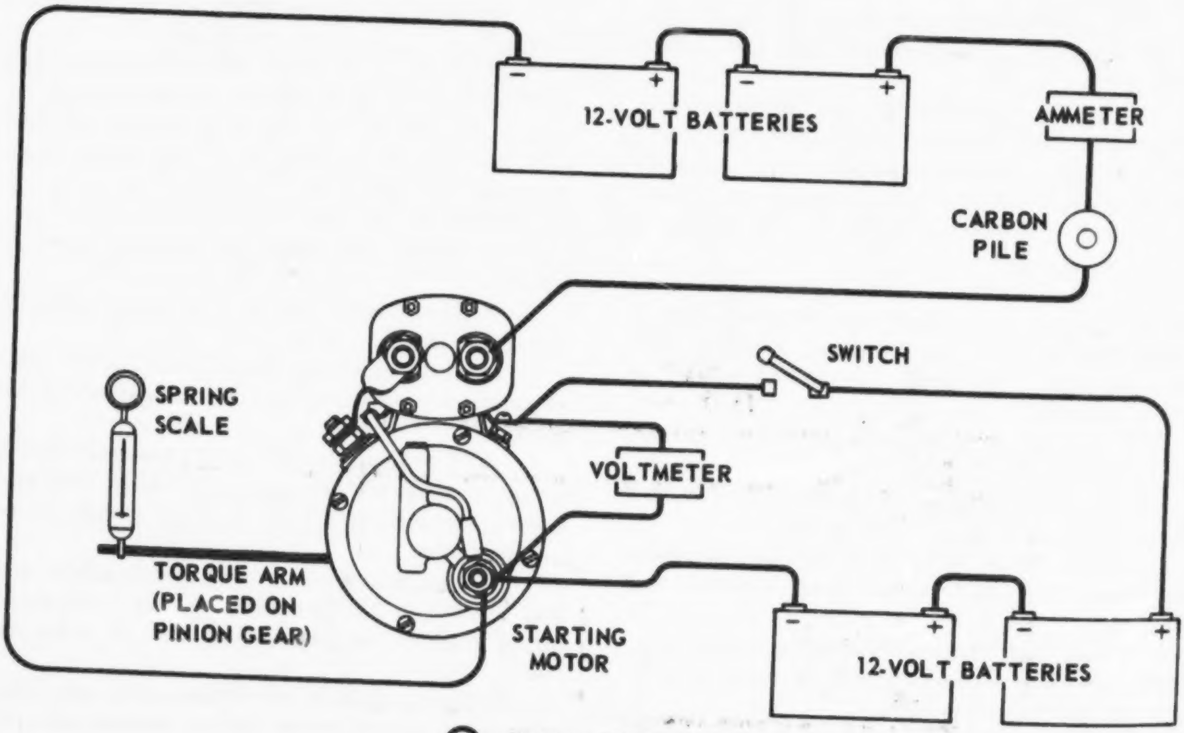
(4) *Armature end play adjustment.* Adjust end play to 0.005 to 0.030 inches by adding or removing thrust washers on commutator end of armature shaft.

(5) *Pinion position adjustment (fig. 6-9).* This adjustment assures correct relation between solenoid and indexing drive assembly. If adjustment is not correct, damage may result to drive gear and/or flywheel ring gear.


SERIES WINDING CON.
VOLTMETER
CONTROL SWITCH
VOLTMETER
SHUNT WINDING CONNECTIONS
AMMETER
CARBON PILE
AMMETER
CARBON PILE
12-VOLT BATTERIES
12-VOLT BATTERIES

A NO LOAD TEST

B SOLENOID WINDING TEST


12-VOLT BATTERIES
AMMETER
CARBON PILE
SWITCH
SPRING SCALE
VOLTMETER
TORQUE ARM (PLACED ON PINION GEAR)
STARTING MOTOR
12-VOLT BATTERIES

C STALL TORQUE TEST

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Figure 6-8. Starting motor assembly test setup.

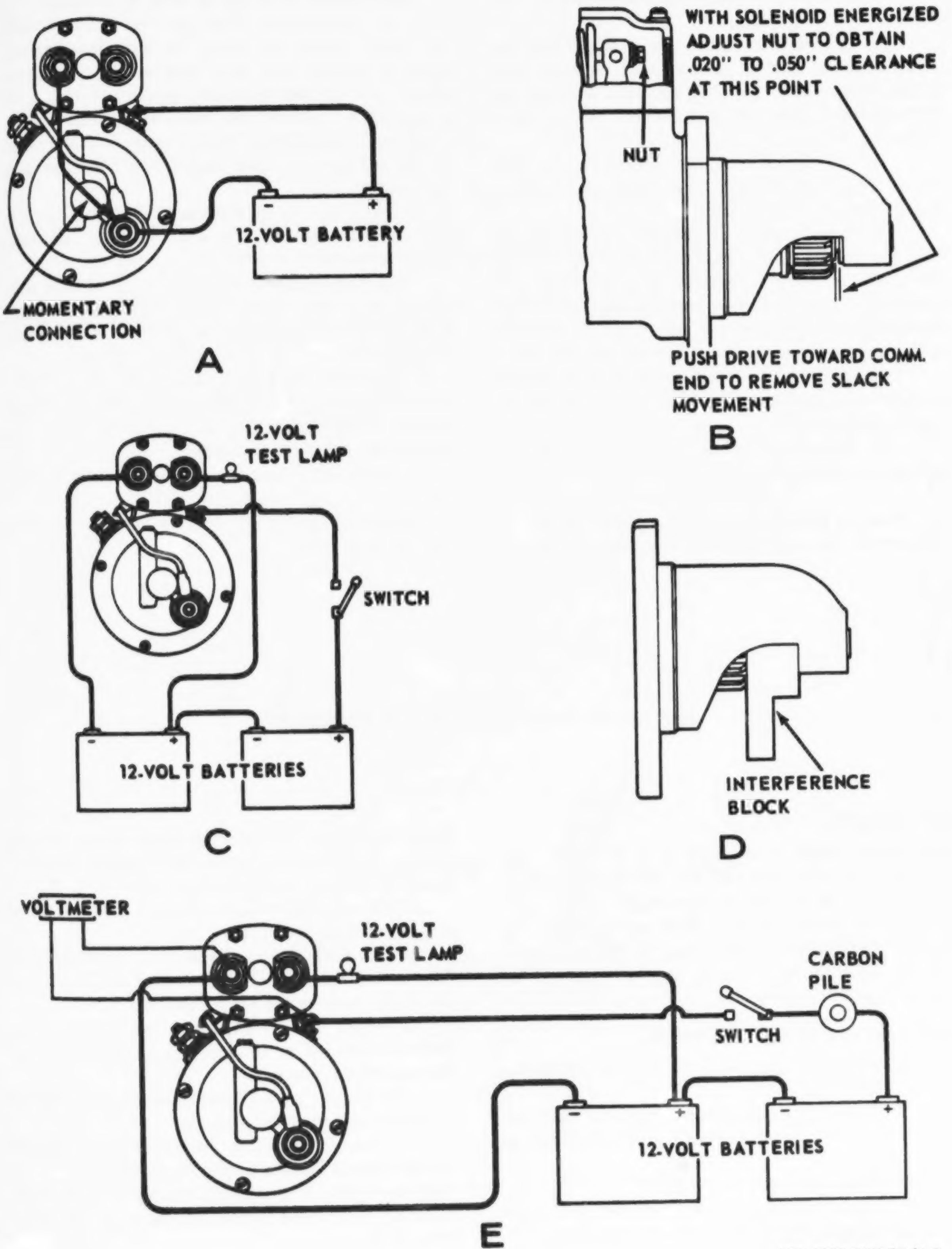
MOMENTARY CONNECTION
12-VOLT BATTERY
A
WITH SOLENOID ENERGIZED ADJUST NUT TO OBTAIN .020'' TO .050'' CLEARANCE AT THIS POINT
NUT
PUSH DRIVE TOWARD COMM. END TO REMOVE SLACK MOVEMENT
B
12-VOLT TEST LAMP
SWITCH
12-VOLT BATTERIES
C
INTERFERENCE BLOCK
D
VOLTMETER
12-VOLT TEST LAMP
CARBON PILE
SWITCH
12-VOLT BATTERIES
E

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Figure 6-9. Starting motor assembly pinion position test setup.

(a) Connect a 12-volt battery as shown in view A.

(b) Momentarily touch the jumper lead between terminal stud of solenoid and terminal stud in commutator end head. This will shift solenoid and drive assembly into cranking position until battery is disconnected.

(c) Push drive assembly toward commutator end of motor to eliminate any slack movement in linkage.

(d) Measure distance between outside edge of drive sleeve and thrust washer as shown in view B. This distance should be 0.020 to 0.050 inches. If measurement is not correct, remove plug and washer from shift linkage cover and adjust nut as required to obtain proper measurement. Disconnect battery.

(e) Fabricate an interference block as shown in figure 5-12. Make test setup as shown in view C. Leave switch open.

(f) Place interference block with 63/64-inch side against drive gear as shown in view D.

CAUTION

Because of high amount of current being passed through solenoid winding, these tests should be made as brief as possible.

(g) Close switch in battery circuit. The 12-volt test lamp should not light. Be sure interference block is against drive gear and not against drive sleeve. If lamp does not light, proceed to step h. If lamp lights, solenoid has been assembled wrong. Reassemble solenoid in reverse numerical sequence shown in figure 6-7, then repeat Bench Testing and Adjustment.

(h) If test lamp does not light, open switch and connect a carbon pile and voltmeter into test circuit as shown in view E.

(i) Place interference block with ½-inch side against drive gear. Close switch and be sure interference block is against drive gear and not against drive sleeve.

(j) Adjust carbon pile and observe voltmeter. The test lamp must light before the voltmeter reads 16 volts. If lamp does not light, adjust nut (view B) until proper setting is obtained.

(k) Reinstall plug and washer in shift linkage cover.

g. Installation. Install starting motor assembly (para 3-105).

Section IV. ENGINE RADIATOR ASSEMBLY

6-7. General

The engine radiator assembly is a standard core, tank, and fin arrangement. The hot engine coolant flows into the upper tank of the radiator, drains down through the core to the lower tank, and back into the engine. The fins on the core act as a heat sink cooling the liquid as air is drawn through the radiator by the engine driven fan.

6-8. Engine Radiator Assembly

a. Removal. Remove radiator and oil cooler assembly (para 3-73).

b. Disassembly. Disassemble radiator and oil cooler assembly in numerical sequence shown in figure 6-10.

c. Cleaning, Inspection, and Repair.

(1) Before cleaning, inspect radiator for visual evidence of leaks. Mark any leaks for repair later.

(2) Clean dirt and foreign matter from radiator core using compressed air directed through core. Clean outside of radiator assembly using cleaning solvent that is in accordance with Federal specification P-D-680. Dry thoroughly.

(3) Flush fresh water through radiator to remove loose scale and rust.

(4) Plug all openings except the overflow tube. Connect a three to five PSI air source to the overflow pipe and submerge radiator in water.

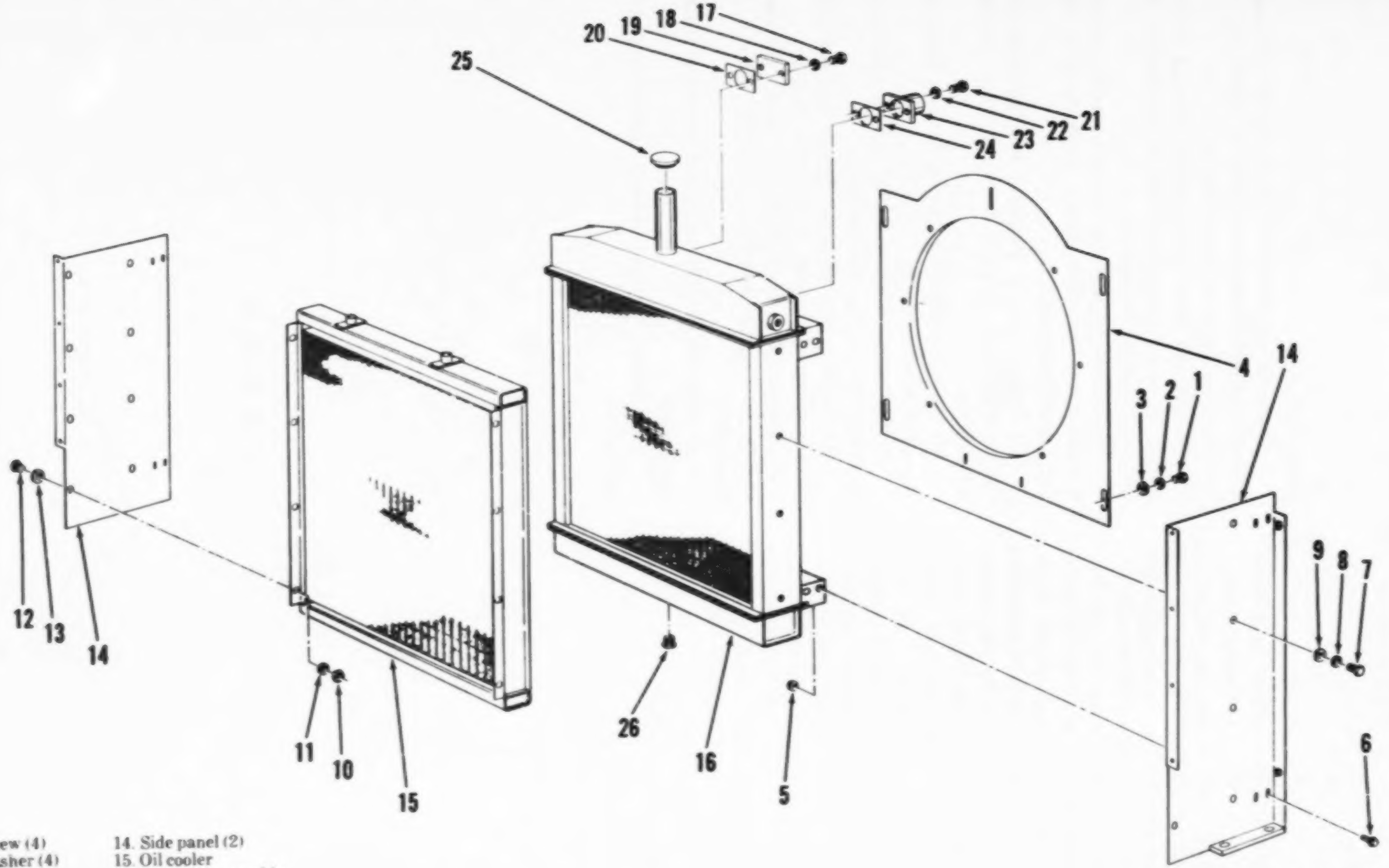
(5) Apply low pressure air. Check radiator for leaks as indicated by air bubbling up through water. Mark each leak detected.

(6) Solder or braze all leaks detected and recheck by repeating steps 4 and 5, above.

(7) Inspect attaching hardware for damaged threads, cracks, breaks, or any other defect.

d. Reassembly. Reassemble radiator and oil cooler assembly in reverse numerical sequence shown in figure 6-10.

e. Installation. Install radiator and oil cooler assembly (para 3-73).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1. Screw (4)
2. Washer (4)
3. Washer (4)
4. Fan shroud
5. Nut (8)
6. Bolt (8)
7. Screw (8)
8. Washer (8)
9. Washer (8)
10. Nut (8)
11. Washer (8)
12. Bolt (8)
13. Washer (8)
14. Side panel (2)
15. Oil cooler
16. Radiator assembly
17. Screw (4)
18. Washer (4)
19. Cover (2)
20. Gasket (2)
21. Screw (4)
22. Washer (4)
23. Flange (2)
24. Gasket (2)
25. Pressure cap
26. Bushing

Figure 6-10. Radiator and oil cooler assembly; disassembly and reassembly.

Section V. OVERSPEED GOVERNOR SWITCH

6-9. General

The overspeed governor switch is driven by a cable from the service meter on the fuel transfer pump. The switch is normally open when the engine is running at proper operating speeds. Should the engine overspeed, the switch closes and completes the electrical circuit to the fuel rack shutoff solenoid. The fuel rack solenoid energizes and moves the fuel rack to the extreme fuel off position shutting down the engine. When the engine is running, the drive cable rotates a shaft within the overspeed governor switch. Attached to the shaft is a weight and spring assembly. As the shaft rotates, centrifugal force causes the weights to fly outward, however, their actual outward movement is suppressed by the springs. When the shaft speed reaches a certain point, centrifugal force overcomes spring suppression, the weights swing further outward and trip a switch which closes the circuit to the fuel rack shutoff solenoid. After the cause of the engine overspeed is corrected, a reset pushbutton on the switch, when depressed, opens the circuit to the fuel rack solenoid and the engine can be started again.

6-10. Overspeed Governor Switch

a. Removal. Remove overspeed governor switch (para 3-67).

b. Disassembly. Disassemble overspeed governor switch in numerical sequence shown in figure 6-11.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect springs for defective coils, cracks, distortion, or any other defect. Refer to Table 5-2 for spring free length.

(3) Inspect shaft, weights, and bushings for cracks, distortion, breaks, excessive wear, or any other defect.

(4) Inspect switch for cracks, broken leads, or any other defect.

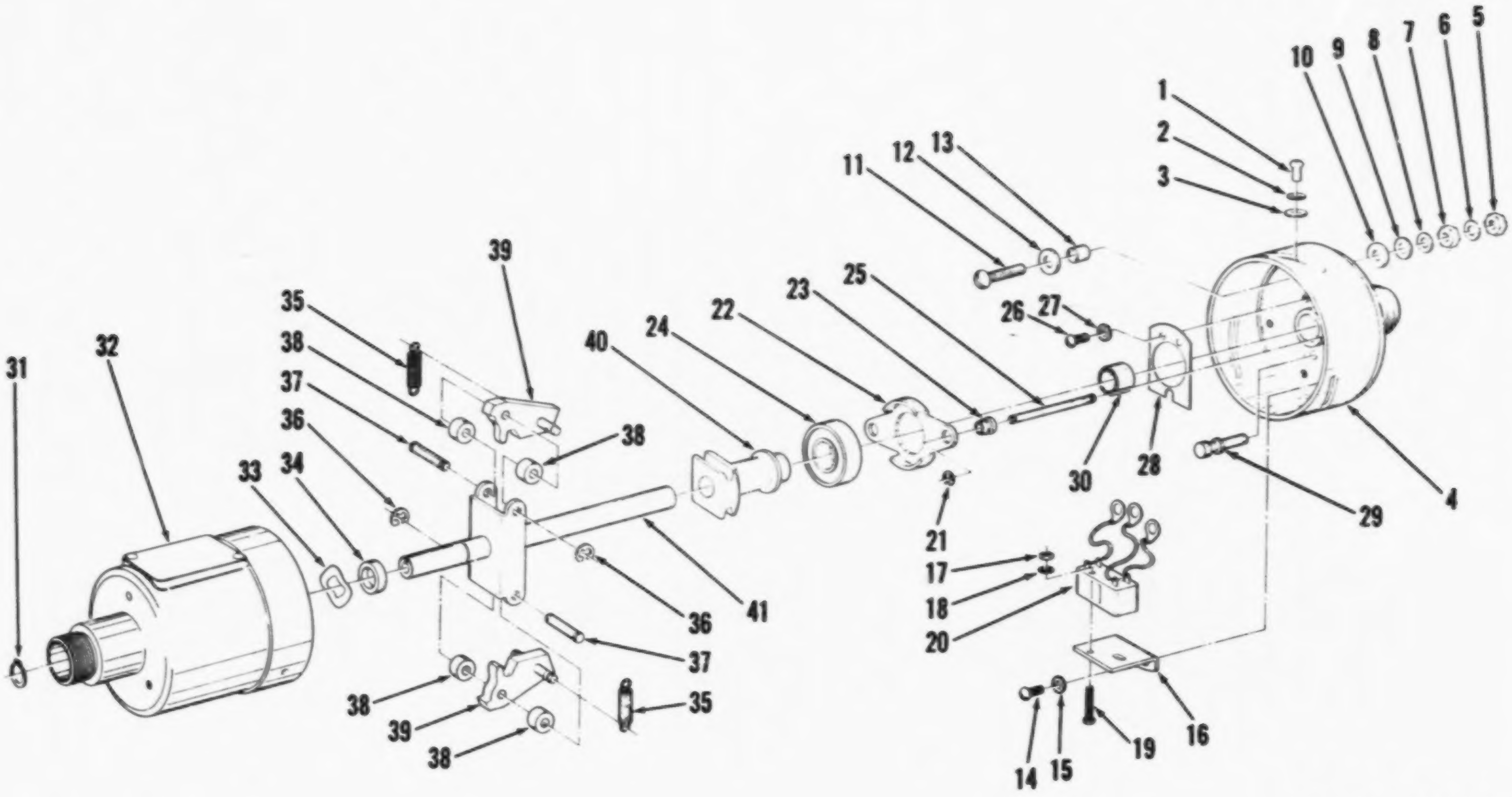
(5) Inspect all other parts for cracks, distortion, excessive wear, or any other defect.

(6) Inspect attaching hardware for damaged threads, distortion, cracks, or any other defect.

d. Reassembly. Reassemble overspeed governor switch in reverse numerical sequence shown in figure 6-11.

e. Installation. Install overspeed governor switch (para 3-67).

f. Adjustment. Adjust overspeed governor switch (para 3-67).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1. Screw (3)
2. Washer (3)
3. Washer (3)
4. Cover
5. Nut (3)
6. Wesher (3)
7. Nut (3)
8. Washer (3)
9. Washer (3)
10. Insulating washer (3)
11. Bolt (3)
12. Insulating washer (3)
13. Insulating tube (3)
14. Screw (2)
15. Washer (2)
16. Bracket
17. Nut (2)
18. Washer (2)
19. Bolt (2)
20. Switch
21. Retaining ring
22. Thrust plate
23. Bushing (2)
24. Bearing
25. Guide pin (2)
26. Screw (2)
27. Washer (2)
28. Reset plate
29. Reset plunger
30. Bushing
31. Retaining ring
32. Body and bearing assy
33. Washer
34. Collar
35. Spring (2)
36. Retaining ring (2)
37. Weight pin (2)
38. Spacer (4)
39. Weight (2)
40. Sleeve
41. Spider and shaft assy

Figure 6-11. Overspeed governor switch; disassembly and reassembly.

Section VI. TURBOCHARGER ASSEMBLY

6-11. General

The turbocharger, which is driven by the engine exhaust gases, draws in ambient air, compresses the air, and directs it into the engine intake manifold. This process supercharges the engine which results in a greater power output. The turbocharger consists of a turbine wheel and a compressor impeller mounted on a common rotating shaft, a bearing housing, compressor cover, and compressor back plate. The rotating assembly is supported by bearings and is dynamically balanced to provide freedom from vibration. Filtered engine oil flows through the turbocharger to lubricate and cool the bearings. Maximum turbocharger speed is determined by the fuel rack setting, the governed engine speed, and the altitude at which the unit is operating.

6-12. Turbocharger Assembly

a. Removal. Remove the turbocharger assembly (para 3-115).

b. Prior to Disassembly.

(1) Cover all turbocharger openings and clean all exterior surfaces using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry unit thoroughly and remove opening coverings.

(2) Punch mark turbocharger compressor cover, turbine housing, and bearing housing to ensure correct positioning upon reassembly.

c. Disassembly. Disassemble turbocharger assembly in numerical sequence shown in figure 6-12.

NOTE

Before removing impeller, ensure alignment marks on impeller and shaft are visible. Rotating parts must be aligned during reassembly to maintain the previously established dynamic balance of turbocharger.

(1) Before disassembly of rotating parts, measure shaft end clearance. End clearance should be 0.006 to 0.011 inches. If clearance is excessive, or if either the turbine wheel or impeller has rubbed against housing of cover, the bearings and/or thrust bearing and thrust collar must be replaced.

(2) Fabricate a fixture, fixture adapter, supporting screw, wood dowel, and wrench as shown in figures 5-5 and 5-6. These tools are to be used for disassembly of rotating parts.

(3) Bolt fixture adapter to fixture (fig. 6-12). Attach bearing housing to fixture with turbine wheel down.

CAUTION

Proper installation of supporting screw is important so as to allow an unobstructed pressing action on shaft and still prevent turbine wheel from being damaged by striking against fixture base.

(4) Thread supporting screw into base of fixture to contain turbine wheel and shaft when pressed from impeller. Leave a space between end of screw and turbine wheel. Approximately ½-inch of shaft and turbine wheel movement is required to free them from impeller.

(5) When removing impeller, remove nut and then position compressor end of housing in a hot oil bath so only impeller is immersed. Heat impeller to 350 F. for not longer than 10 minutes. Remove unit from oil bath and press shaft and turbine wheel as a unit from impeller.

(6) Use the wood dowel to remove thrust plate assembly from center housing.

d. Cleaning, Inspection, and Repair.

CAUTION

Rotating components must be thoroughly cleaned in order to maintain critical balance of turbocharger. Do not use a wire brush or wheel on any parts.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Use a piece of wood to clean carbon and deposits from turbine housing. Discard all seals and O-rings.

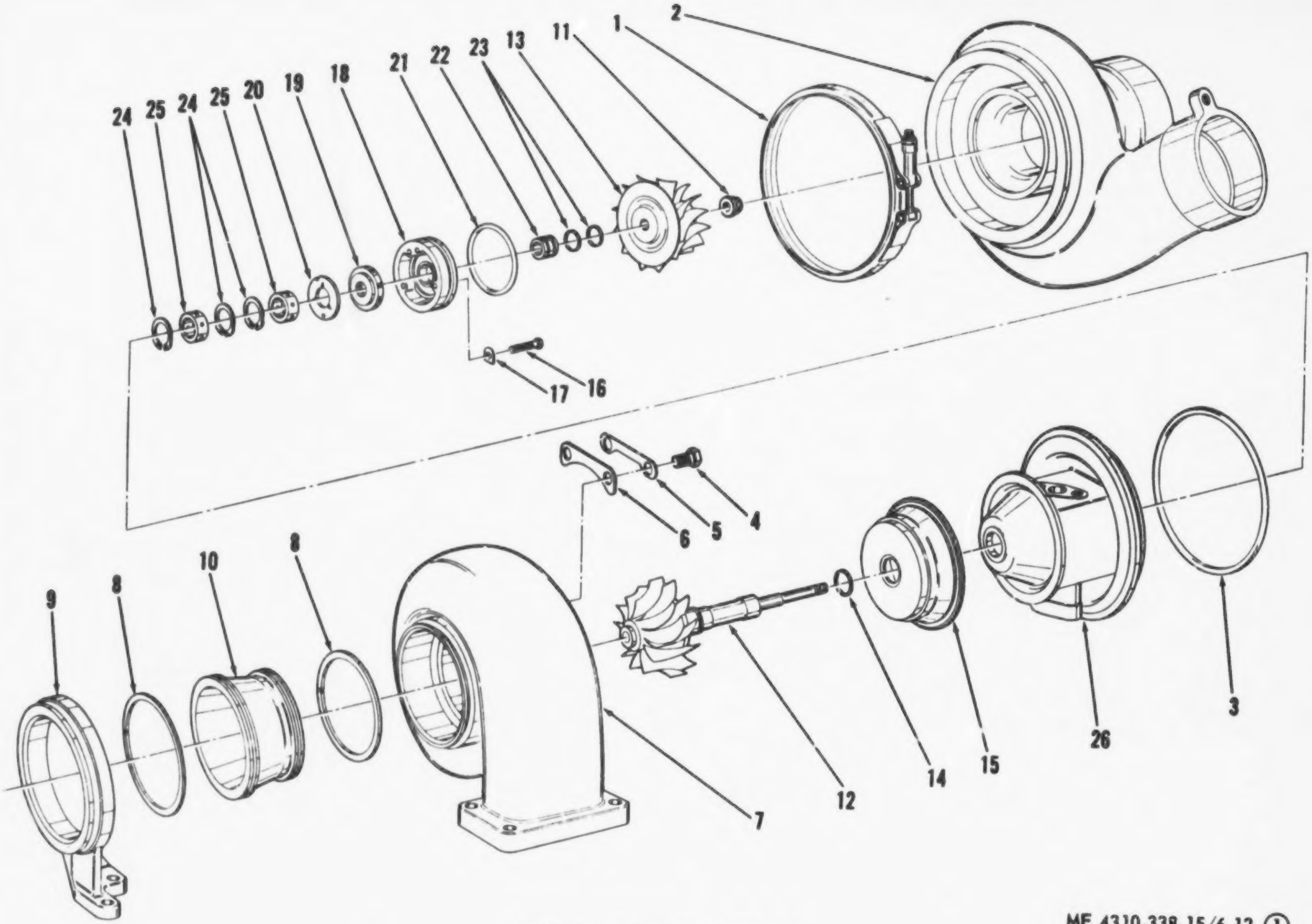
(2) The turbine wheel must be cleaned thoroughly to remove all carbon deposits. It may be necessary to soak wheel in solvent for at least one hour to remove hardened carbon deposits. Scrape off loosened particles with a stiff brush or a specially shaped piece of wood. If turbine wheel is covered with soot only, use cleaning solvent and a stiff brush, rinse with clean water, and dry thoroughly.

CAUTION

The following step is a critical area of inspection. Any deformation or damage to wheels will cause a serious out-of-balance condition which will damage turbocharger.

(3) Inspect compressor and turbine wheels for cracks, wear, chips, or any other defect. Check carefully for any blade distortion.

(4) Inspect bearings for cracks, distortion, or any other defect. Measure bearing diameters. Inside diameters should measure 0.6268 to 0.6272 inches; outside diameter 0.9780 to 0.9875 inches.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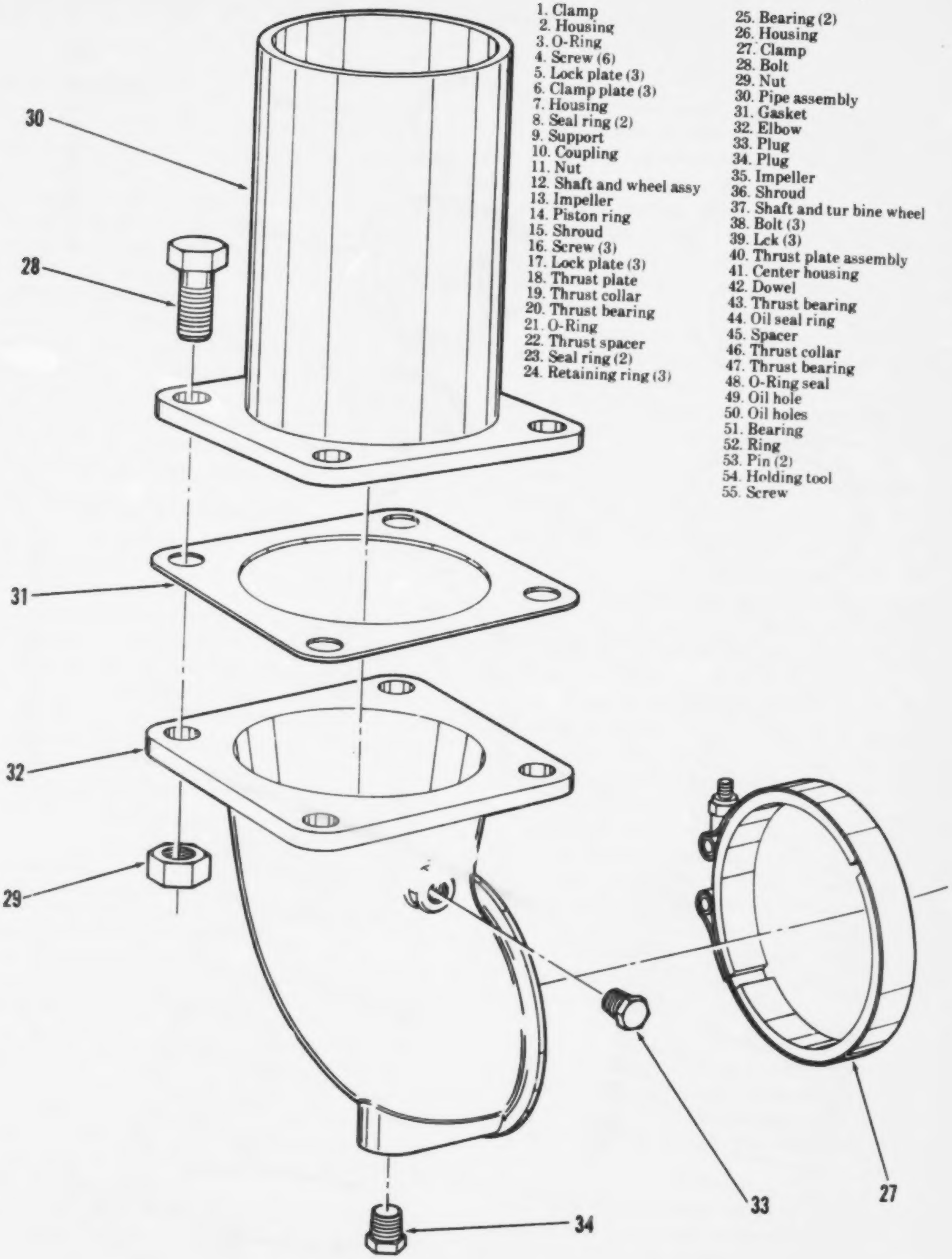
TURBOCHARGER ASSEMBLY

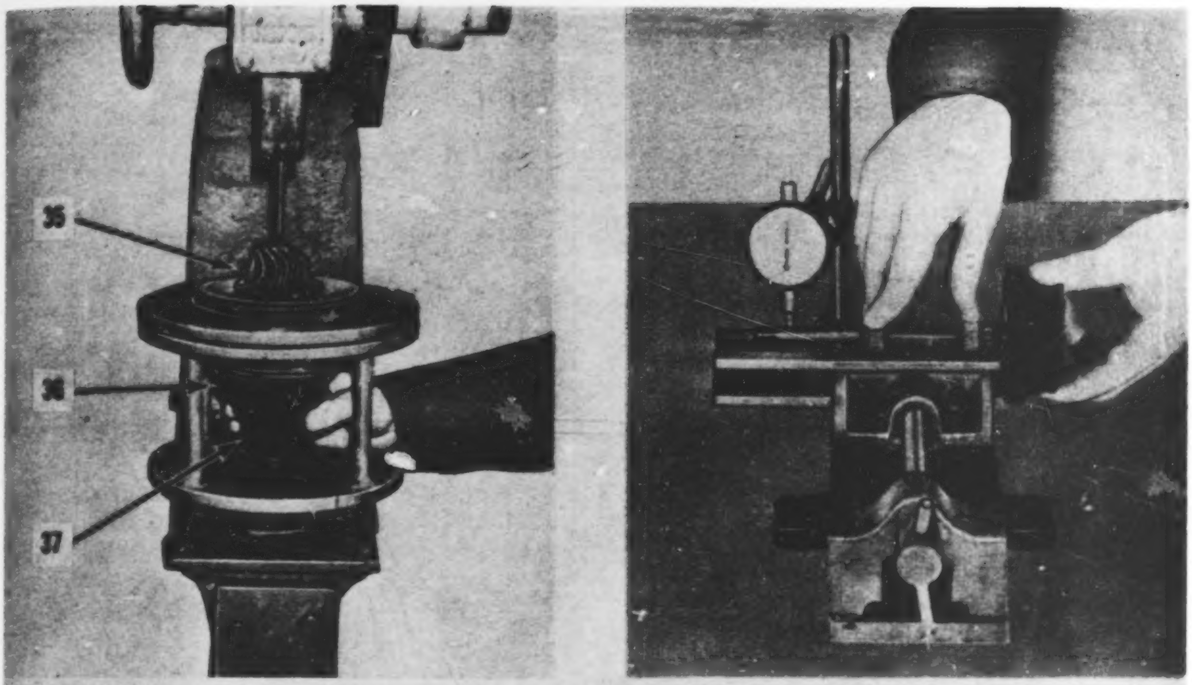
Figure 6-12. Turbocharger Assembly, Disassembly and Reassembly sheet 1 of 5



1. Clamp
2. Housing
3. O-Ring
4. Screw (6)
5. Lock plate (3)
6. Clamp plate (3)
7. Housing
8. Seal ring (2)
9. Support
10. Coupling
11. Nut
12. Shaft and wheel assy
13. Impeller
14. Piston ring
15. Shroud
16. Screw (3)
17. Lock plate (3)
18. Thrust plate
19. Thrust collar
20. Thrust bearing
21. O-Ring
22. Thrust spacer
23. Seal ring (2)
24. Retaining ring (3)
25. Bearing (2)
26. Housing
27. Clamp
28. Bolt
29. Nut
30. Pipe assembly
31. Gasket
32. Elbow
33. Plug
34. Plug
35. Impeller
36. Shroud
37. Shaft and turbine wheel
38. Bolt (3)
39. Lck (3)
40. Thrust plate assembly
41. Center housing
42. Dowel
43. Thrust bearing
44. Oil seal ring
45. Spacer
46. Thrust collar
47. Thrust bearing
48. O-Ring seal
49. Oil hole
50. Oil holes
51. Bearing
52. Ring
53. Pin (2)
54. Holding tool
55. Screw

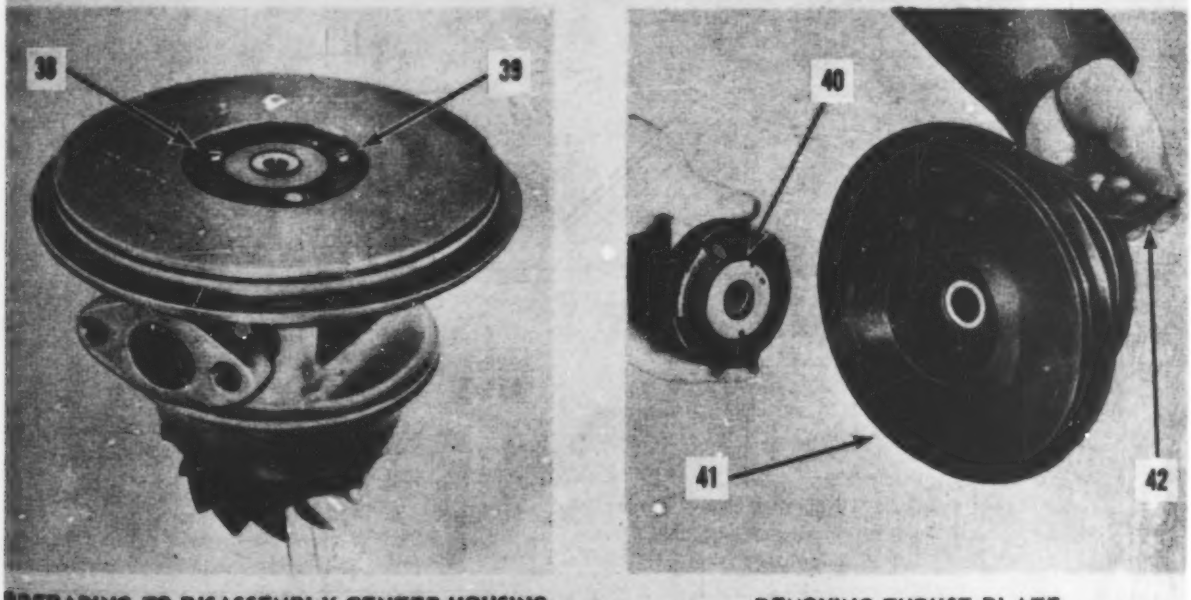
AIR INTAKE TUBE AND ELBOW

Figure 6-12. Turbocharger assembly, disassembly and reassembly (sheet 2 of 5).



PRESSING SHAFT AND TURBINE WHEEL FROM IMPELLER

CHECKING SHAFT RUNOUT



PREPARING TO DISASSEMBLY CENTER HOUSING

REMOVING THRUST PLATE

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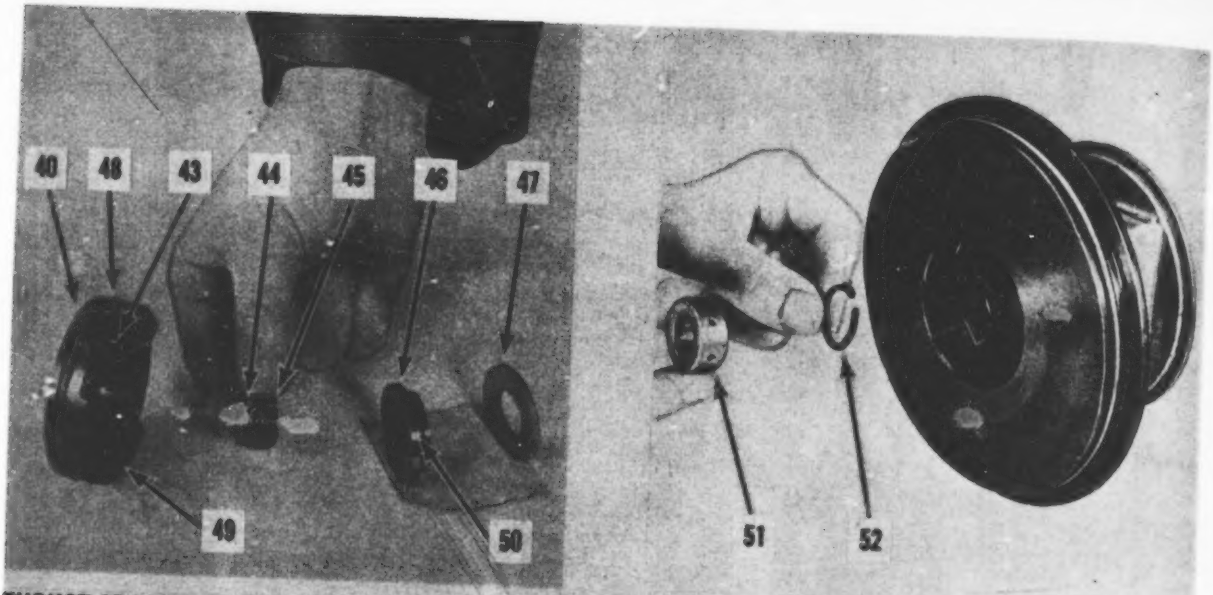
Figure 6-12. Turbocharger assembly, disassembly and reassembly (sheet 3 of 5).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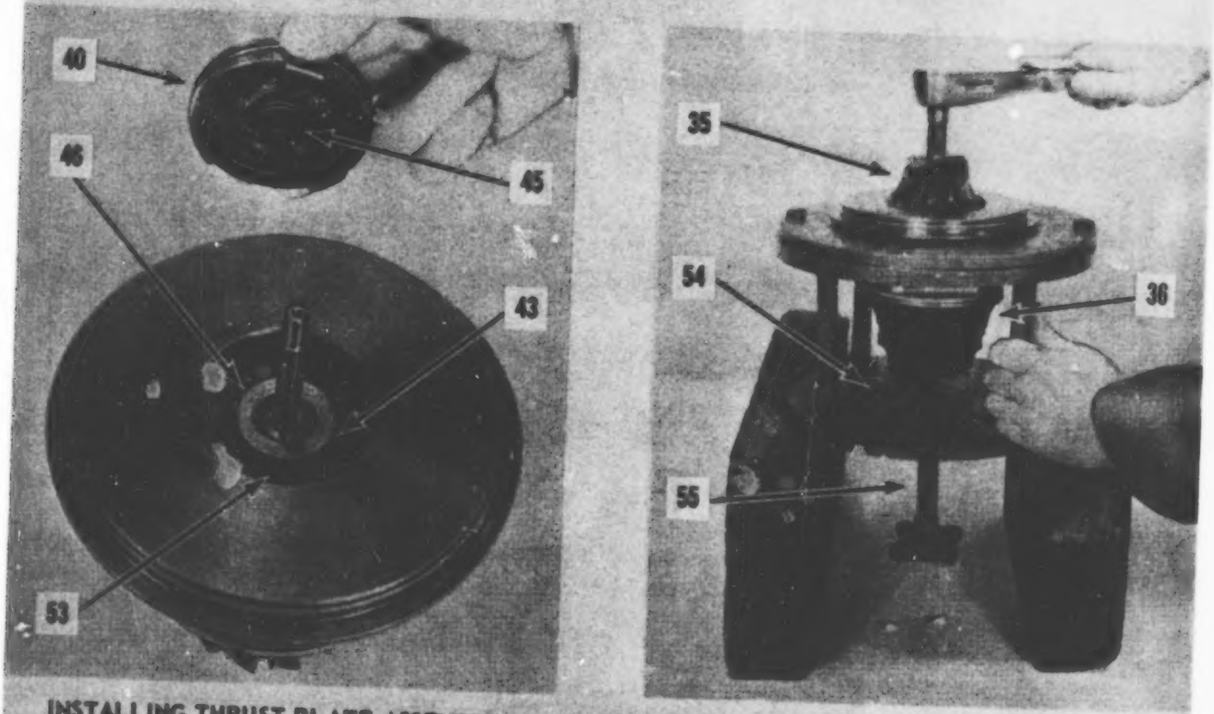
THRUST SPACER, PLATE AND WASHER REMOVAL

BEARING REMOVAL (COMPRESSOR END)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INSTALLING THRUST PLATE ASSEMBLY

INSTALLING NUT ON SHAFT

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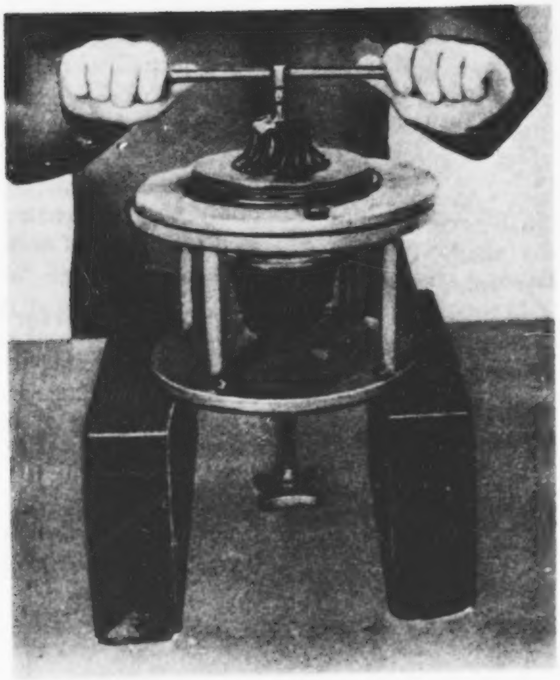
Figure 6-12. Turbocharger assembly, disassembly and reassembly (sheet 4 of 5).



TIGHTENING IMPELLER NUT

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Figure 6-12. Turbocharger assembly, disassembly and reassembly (sheet 5 of 5).

(5) Check runout of shaft (fig. 6-12). This can be done by one of two methods. Use standard bearings and place shaft in vee blocks or use a partially open vise.

(6) Inspect shaft for cracks, roughness, distortion, or any other defect. Check ring grooves for wear. Measure journal diameter; measurement should be 0.6250 to 0.6254 inches.

(7) Inspect housing for cracks, breaks, or any other defect. Measure housing bore diameter; measurement should be 0.9827 to 0.9832 inches.

(8) Inspect all other parts for cracks, distortion, breaks, excessive wear, or any other defect.

(9) Inspect all attaching hardware for damaged threads, distortion, cracks, or any other defect.

e. Reassembly. Reassemble turbocharger assembly in reverse numerical sequence shown in figure 6-12. Install new seals and o-rings.

(1) Install thrust collar with large outside diameter toward impeller end.

(2) After installing piston ring on spacer, install spacer in thrust plate assembly so that piston ring will be toward impeller.

(3) Install impeller as follows:

(a) Heat impeller in an oil bath 350 °F. for not longer than ten minutes.

(b) Place heated impeller on shaft and immediately install nut. Tighten nut to a torque value of 120 inch-pounds.

(c) Allow impeller to cool, then remove nut.

(d) Clean and smooth washer face of nut. Lightly oil threads of turbine shaft and nut.

(e) Reinstall nut and tighten to a torque value of 20 inch-pounds. After tightening, turn nut an additional 120 .

(4) During assembly, use specially fabricated fixture and tools as required.

(5) Be sure that alignment marks previously placed on turbocharger match when unit is reassembled.

(6) Be sure that oil holes in thrust plate assembly align with oil holes in bearing housing.

f. Installation. Install turbocharger assembly (para 3-115).

Section VII. FUEL TRANSFER PUMP ASSEMBLY AND FUEL PRIMING PUMP ASSEMBLY

6-13. General

The gear-type fuel transfer pump is driven by a gear on the engine accessory drive shaft. The pump causes fuel to flow from the fuel tanks, through the filtering system, and into the fuel injection housing. A bypass valve on the starting tank prevents an excessive fuel pressure buildup. At cranking speed, the fuel transfer pump supplies fuel to the engine at 10 to 20 PSI. Fuel pressure must reach 10 PSI before the engine will start. The fuel transfer pump consists of a gear driven shaft supported by sleeve bearings, fuel propelling gears, seals, a bypass valve, and the housing components. The fuel priming pump is operated manually to purge air from the fuel lines and to prime the fuel system. Essentially, the priming pump consists of a plunger, barrel, handle, and body.

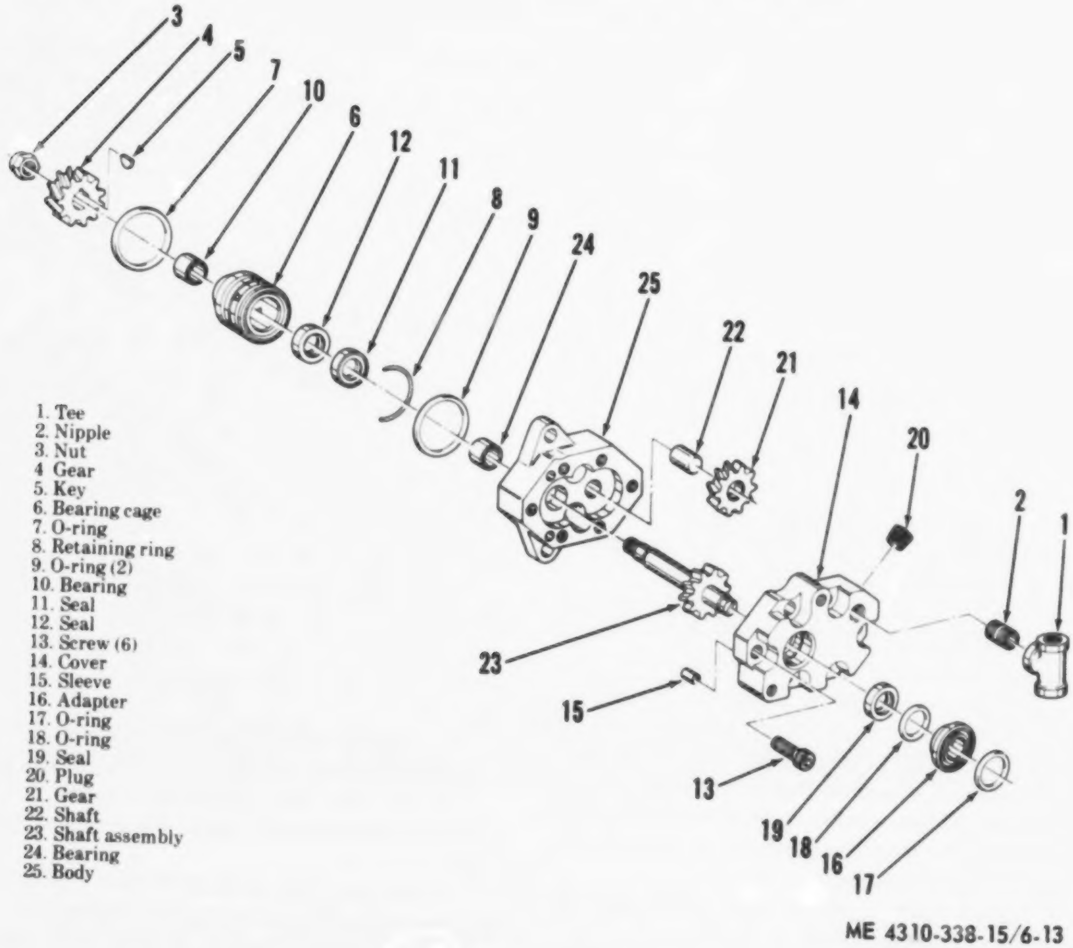
6-14. Fuel Transfer Pump Assembly

a. Removal. Remove fuel transfer pump assembly (para 3-95).

b. Disassembly. Disassemble fuel transfer pump assembly in numerical sequence shown in figure 6-13.

NOTE

Body and cover should be carefully pried apart due to the sealant that was used during assembly.



1. Tee
2. Nipple
3. Nut
4. Gear
5. Key
6. Bearing cage
7. O-ring
8. Retaining ring
9. O-ring (2)
10. Bearing
11. Seal
12. Seal
13. Screw (6)
14. Cover
15. Sleeve
16. Adapter
17. O-ring
18. O-ring
19. Seal
20. Plug
21. Gear
22. Shaft
23. Shaft assembly
24. Bearing
25. Body

Figure 6-13. Fuel Transfer Pump Assembly; Disassembly and Reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Be sure to clean body and cover thoroughly where sealant was used. Discard all seals and O-rings.

(2) Inspect all gears for chipped or badly worn teeth, cracks, distortion, or any other defect.

(3) Inspect shaft for distortion, breaks, cracks, or any other defect. Measure shaft diameter; measurement should be 0.4936 to 0.4938 inches.

(4) Inspect sleeve bearings for cracks, flat spots, distortion, or any other defect. Measure inside diameter of each bearing; measurement should be 0.4950 to 0.4956 inches.

(5) Inspect all other parts for cracks, breaks, distortion, or any other defect.

(6) Inspect attaching hardware for damaged threads, distortion, or any other defect.

d. Reassembly. Reassemble fuel transfer pump assembly in reverse numerical sequence shown in figure 6-13. Install new seals and O-rings.

(1) Measure bearing clearance. Clearance should be 0.003 inches maximum.

(2) Before installation, lightly lubricate seals with clean engine oil.

CAUTION

Do not allow any sealant to enter pump assembly.

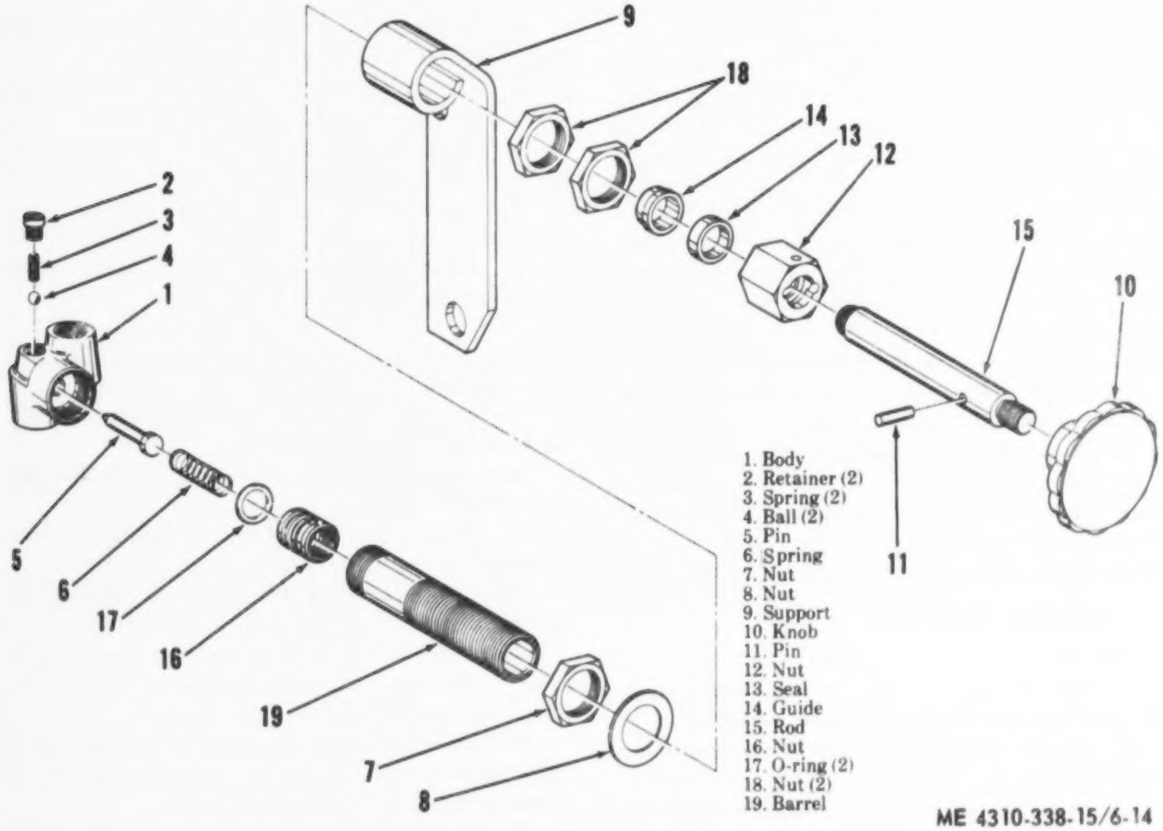
(3) Apply a thin coat of sealant to mating surfaces of body and cover.

e. Installation. Install fuel transfer pump assembly (para 3-95).

6-15. Fuel Priming Pump Assembly

a. Removal. Remove fuel priming pump assembly (para 3-96).

b. Disassembly. Disassemble fuel priming pump assembly in numerical sequence shown in figure 6-14.



1. Body
2. Retainer (2)
3. Spring (2)
4. Ball (2)
5. Pin
6. Spring
7. Nut
8. Nut
9. Support
10. Knob
11. Pin
12. Nut
13. Seal
14. Guide
15. Rod
16. Nut
17. O-ring (2)
18. Nut (2)
19. Barrel

Figure 6-14. Fuel Priming Pump Assembly; Disassembly and Reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard seal and O-rings.

(2) Inspect springs for damaged coils, cracks, breaks, distortion, or any other defect. Refer to Table 5-2 for spring free lengths.

(3) Inspect rod, pin, and ball for excessive wear, cracks, breaks, or any other defect.

(4) Inspect barrel and body for cracks, damaged threads, distortion, or any other defect.

(5) Inspect all other parts, including attaching hardware, for cracks, breaks, distortion, damaged threads, or any other defect.

d. Reassembly. Reassemble fuel priming pump assembly in reverse numerical sequence shown in figure 6-14. Install new seal and O-rings.

e. Installation. Install fuel priming pump assembly (para 3-96).

Section VIII. GOVERNOR ASSEMBLY

6-16. General

The governor assembly regulates the engine speed for each given load demand. A control lever on the governor selects the engine speed. This lever is connected to the air compressor speed control linkage and when the compressed air demand increases, the speed control linkage moves the control lever to increase engine RPM. An increase in engine RPM results in an increase in compressor output. When the engine is running, the centrifugal force of revolving weights within the governor and the force of a spring controls the movement of a valve. The valve directs oil, under pressure, to either a large volume section or small volume section of a piston which is connected to the fuel rack. The pressurized oil will move the piston and fuel rack either forward to increase the amount of fuel to the engine, or backward to decrease the fuel. A solenoid fastened to the governor is wired to various safety switches on the air compressor unit. If a malfunction develops, the solenoid energizes and mechanically pulls the fuel rack to the extreme fuel off position, stopping the engine. This shutoff function is also manually controlled using a control cable located on the instrument panel assembly.

6-17. Governor Assembly

a. Removal.

(1) Remove speed control rod and control cable from governor control arms (fig. 3-34 and 3-68).

(2) Remove governor assembly as shown in figure 6-15.

b. Disassembly. Disassemble governor assembly in numerical sequence shown in figure 6-16.

NOTE

Guide (67) will be damaged when removed and must be replaced each time governor assembly is disassembled.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard all gaskets and O-rings.

(2) Inspect housing and covers for cracks, breaks, distortion, or any other defect.

(3) Inspect all thrust and sleeve bearings for scoring, distortion, cracks, or any other defect.

(4) Inspect springs for damaged or distorted coils. Refer to Table 5-2 for spring free length.

(5) Inspect weights for sticking, cracks, or any other defect.

(6) Inspect weight assembly piston and valve for distortion, cracks, or any other defect.

NOTE

If either the valve or piston is faulty, replace both with a matched set.

(7) Inspect all shafts for distortion, out-of-round, score marks, or any other defect.

(8) Inspect insulator for cracks, breaks, or any other defect.

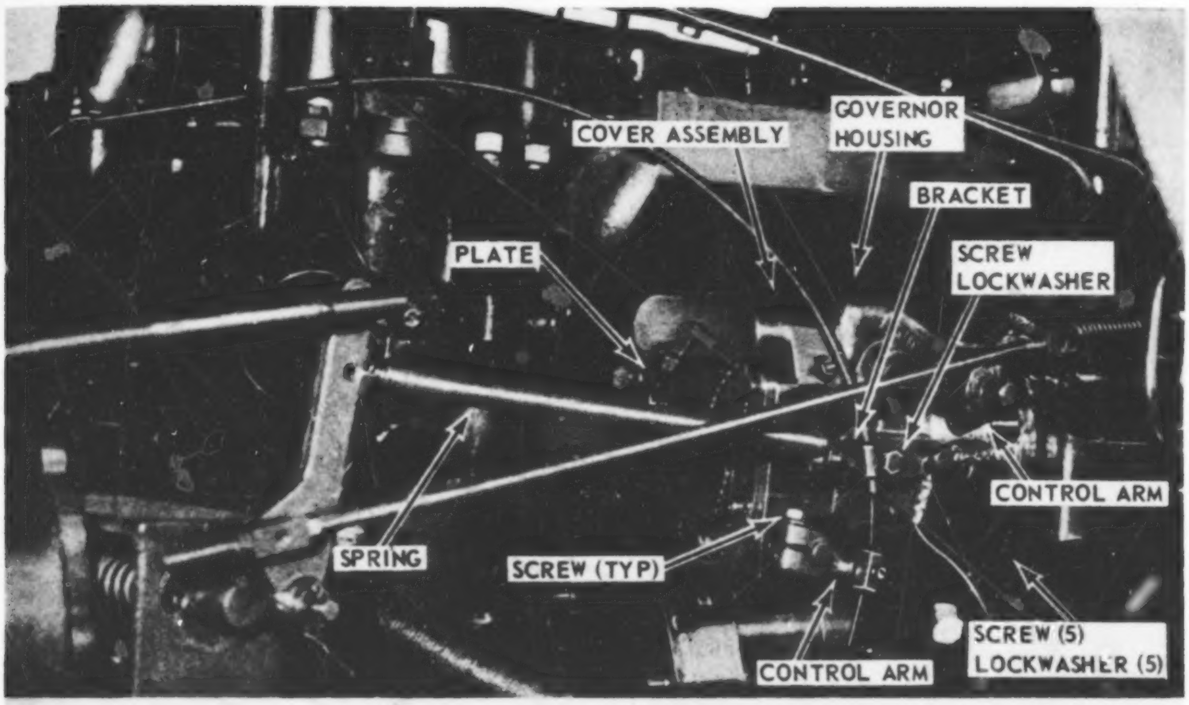
(9) Inspect all other parts for cracks, breaks, distortion, or any other defect.

(10) Inspect all attaching hardware for damaged threads, distortion, cracks, or any other defect.

d. Reassembly. Reassemble governor assembly in reverse numerical sequence shown in figure 6-16. Install new gaskets and O-rings.

(1) When installing new guide (67), form end of guide against, and all the way around, chamfer in governor housing.

(2) When assembling weights to carrier, stake four places around each dowel on both ends. Each weight must have 0.001 to 0.007 inches end play and must pivot freely on its dowel.


COVER ASSEMBLY
GOVERNOR HOUSING
BRACKET
PLATE
SCREW
LOCKWASHER
CONTROL ARM
SPRING
SCREW (TYP)
SCREW (5)
LOCKWASHER (5)
CONTROL ARM

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REMOVAL

STEP 1. LOOSEN SCREWS AND REMOVE BOTH CONTROL ARMS FROM GOVERNOR.

STEP 2. REMOVE SCREW, LOCKWASHER, BRACKET, AND SPRING.

STEP 3. REMOVE PLATE AND COVER ASSEMBLY BY REMOVING CAPSCREWS, SOCKET SCREWS, AND LOCKWASHERS. REMOVE GASKET.

STEP 4. LOOSEN SOCKET SCREW AND REMOVE COLLAR.

STEP 5. REMOVE HOUSING BY REMOVING SCREWS AND LOCKWASHERS.

STEP 6. REMOVE SPRING AND WEIGHT GROUP BY REMOVING SCREWS AND LOCK.

INSTALLATION

STEP 1. INSTALL SPRING AND WEIGHT GROUP AND SECURE WITH SCREWS AND LOCK.

STEP 2. INSTALL HOUSING AND SECURE WITH SCREWS AND LOCKWASHERS.

STEP 3. INSTALL COLLAR AND SECURE WITH SOCKET SCREW.

STEP 4. INSTALL PLATE AND COVER ASSEMBLY. SECURE WITH CAPSCREWS, SOCKET SCREWS, AND LOCKWASHERS.

STEP 5. INSTALL SPRING AND BRACKET. SECURE WITH SCREW AND LOCKWASHER.

STEP 6. INSTALL CONTROL ARMS AND TIGHTEN SCREWS.

Figure 6-15. Governor assembly; removal and installation.

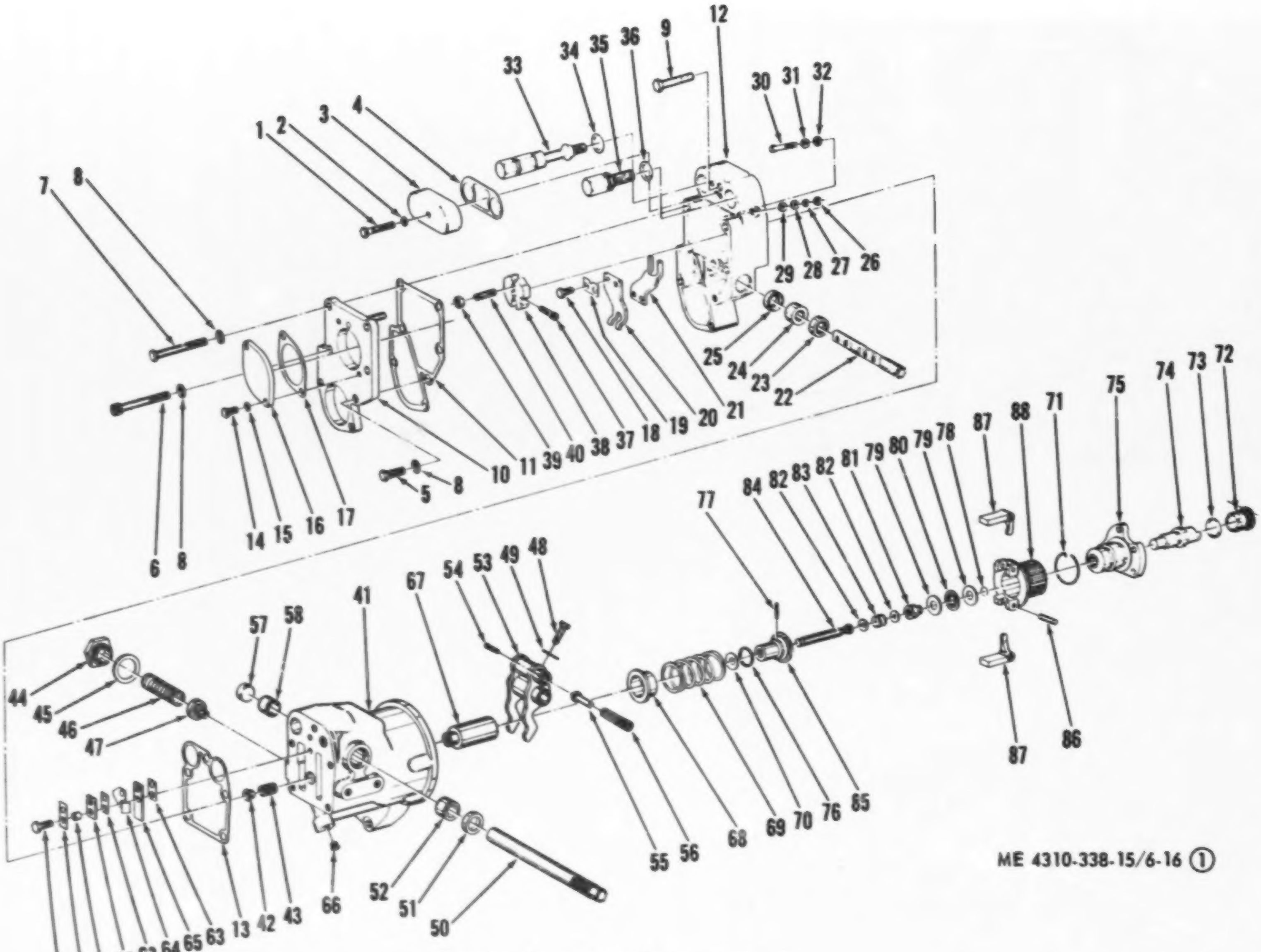
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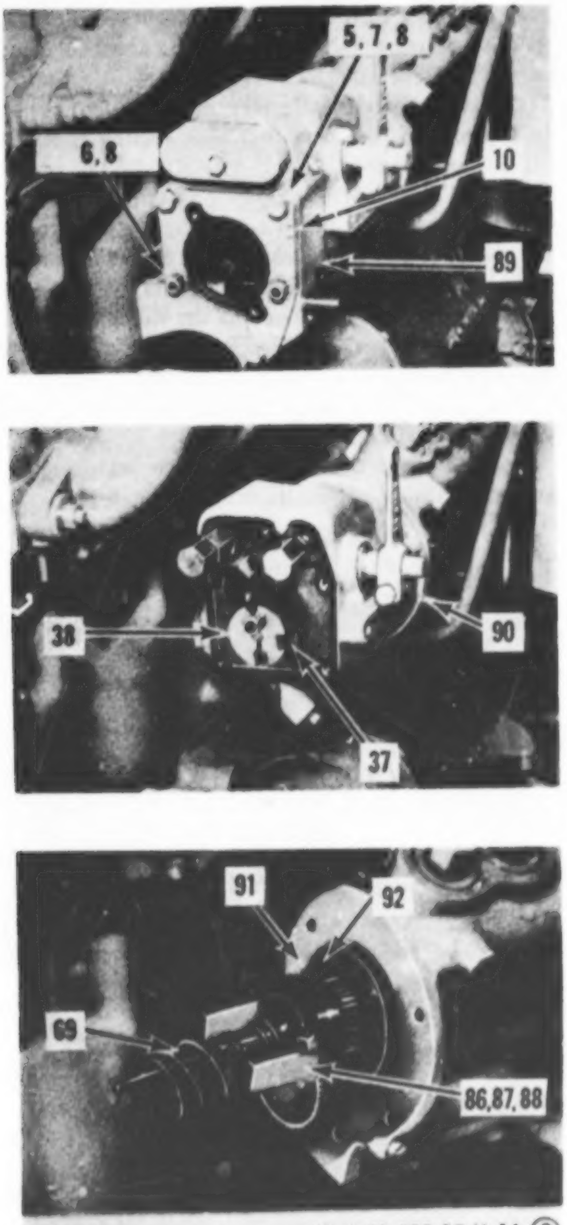
Figure 6-16. Governor assembly, disassembly and reassemble (sheet 1 of 2).



ME 4310-338-15/6-16 ②

Figure 6-16. Governor assembly, disassembly and reassembly. (sheet 2 of 2).

1. Screw
2. Washer
3. Cover
4. Gasket
5. Screw
6. Screw (2)
7. Screw (2)
8. Lockwasher (5)
9. Screw
10. Plate assembly
11. Gasket
12. Cover assembly
13. Gasket
14. Screw (2)
15. Washer (2)
16. Cover
17. Gasket
18. Screw (4)
19. Lock (2)
20. Lever
21. Lever
22. Shaft
23. Seal
24. Bearing
25. Seal
26. Nut
27. Lockwasher
28. Washer
29. Insulator
30. Bolt
31. Washer
32. Insulator
33. Screw
34. O-Ring
35. Screw
36. O-Ring
37. Screw
38. Collar
39. Nut
40. Screw
41. Housing assembly
42. Collar
43. Spring
44. Plug
45. Gasket
46. Spring
47. Plunger
48. Screw
49. Lock
50. Shaft
51. Seal
52. Bearing
53. Lever assembly
54. Pin
55. Plunger
56. Spring
57. Plug
58. Bearing
59. Screw (2)
60. Sleeve (2)
61. Lock
62. Retainer
63. Spacer (2)
64. Contact
65. Bar
66. Plug
67. Guide
68. Seat assembly
69. Spring
70. Spring
71. Lock ring
72. Sleeve
73. O-Ring
74. Piston
75. Cylinder
76. Ring
77. Pin
78. Ring
79. Race (2)
80. Bearing
81. Sleeve
82. Washer (2)
83. Spring
84. Bolt
85. Seat
86. Pin
87. Weight (2)
88. Weight assembly
89. Cover assembly
90. Gasket
91. Screw (3)
92. Lock

e. Backlash Check. Check backlash between drive gear on housing and driven gear on shaft. Measurement should be 0.006 inches maximum.

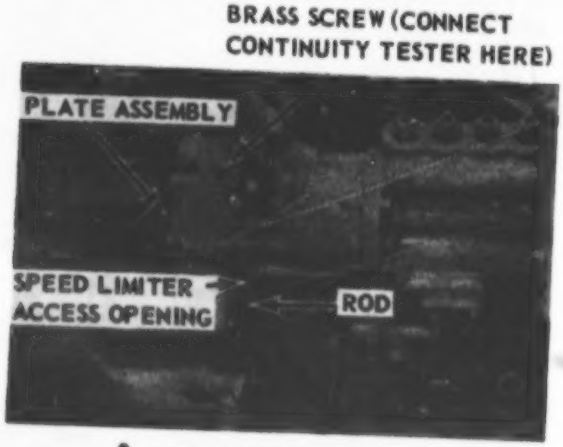
f. Installation. Install governor assembly as shown in figure 6-15. Perform fuel rack setting check and adjustment, below.

g. Fuel Rack Setting Check and Adjustment. The fuel rack setting is based on the following principle: the distance the fuel rack travels from the centered position to the point where the governor stop collar adjusting screw is just touching the stop bar.

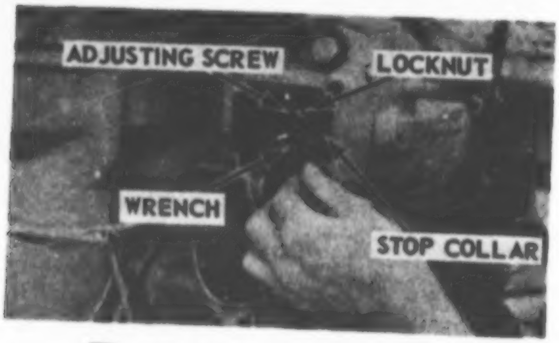
(1) Install fuel rack setting gage (fig. 3-76). Adjust gage to +.085".

(2) Disconnect speed control rod from governor control lever (figure 3-68).

(3) Connect a continuity tester between brass screw terminal and housing (view A, fig. 6-17).


BRASS SCREW (CONNECT CONTINUITY TESTER HERE)
PLATE ASSEMBLY
SPEED LIMITER ACCESS OPENING
ROD

A DEPRESSING PLUNGER



B ADJUSTING RACK SETTING

ME 4310-338-15/6-17

Figure 6-17. Governor assembly fuel rack setting adjustment.

(4) Remove plug and manually depress speed limiter plunger (view A).

NOTE

Speed limiter plunger must be depressed to permit full fuel rack travel when engine is not running.

(5) With speed limiter plunger depressed, move governor control lever in fuel-on direction until continuity tester lights, then slowly reverse direction of lever until tester lamp just goes out.

(6) Slowly, move governor control lever in fuel-on direction until continuity tester just barely lights (dim). Rack collar adjusting screw is now just touching stop bar.

(7) Adjust fuel rack setting gage until it is against end of fuel rack. Gage should indicate +.070" if fuel rack is adjusted correctly. If fuel rack setting is correct, proceed to step 12. If fuel rack setting is not correct, proceed to step 8.

NOTE

Because of engine dimensional tolerances, fuel rack setting may vary from engine to engine. The exact setting for each engine is stamped on engine data plate located on flywheel housing.

(8) Remove plate assembly from governor to gain access to fuel rack stop collar adjusting screw. Loosen locknut on adjusting screw.

CAUTION

When governor cover is removed, stop collar could rotate out of position resulting in a serious fuel rack misadjustment. Ensure stop collar is always positioned properly so that adjusting screw is aligned with stop bar.

(9) Adjust screw (view B) and repeat steps 5 through 7 to obtain correct fuel rack setting.

(10) Tighten adjusting screw locknut to a torque value of 9 to 12 foot-pounds. Recheck fuel rack setting.

(11) Ensure stop collar is positioned properly and install plate assembly.

(12) Install speed limiter access plug.

(13) Disconnect and remove continuity tester.

(14) Remove fuel rack setting gage and reinstall cover.

(15) Connect engine stop control cable to governor control arm (fig. 3-34).

(16) Connect speed control rod to governor control lever and adjust linkage (para 3-88).

Section IX. FUEL INJECTION GROUP

6-18. General

The fuel injection group consists of the fuel injection pump housing, camshaft, fuel injection pumps, fuel injection valves, and associated tubing. Fuel, after passing through the filters, flows into the injection pump housing manifold which distributes the fuel to the injection pumps. The injection pump for each cylinder measures and delivers the fuel to its associated fuel injection valve for insertion into the precombustion chamber. The amount of fuel pumped per stroke is varied by turning the pump plunger in the barrel. This turning is accomplished by governor action through the fuel rack and gear arrangement. Injection pump plungers and lifters are lifted by lobes on the fuel injection camshaft.

6-19. Fuel Injection Pumps

a. Removal. Remove fuel injection pump (para 3-93).

CAUTION

All service work should be done with clean hands and on a clean, lint free cloth. Keep parts for each injection pump separate since each pump has matched parts that are not interchangeable.

b. Disassembly. Disassemble fuel injection pumps in numerical sequence shown in figure 6-18.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect bonnet for damaged threads, cracks, distortion, or any other defect.

(3) Inspect springs for distortion, damaged coils, or any other defect. Refer to Table 5-2 for spring free length.

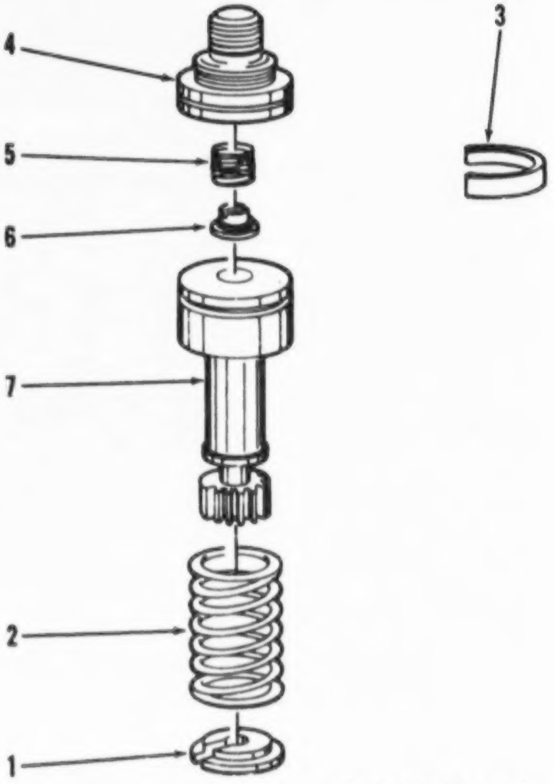
(4) Inspect retaining rings, check valves, barrels, and washers for cracks, distortion, or any other defect.

(5) Use a micrometer and measure plunger length. Length should be 2.5931 to 2.5937 inches. Inspect plungers for excessive wear on end which makes contact with fuel injection pump lifter washers.

NOTE

Whenever a plunger is replaced, it is also necessary to replace associated fuel injection pump lifter assembly.

d. Reassembly. Reassemble fuel injection pump in reverse numerical sequence shown in figure 6-18.



1. Washer
2. Spring
3. Retaining ring
4. Bonnet
5. Spring
6. Check valve
7. Plunger and barrel assembly

Figure 6-18. Fuel injection pump; disassembly and reassembly.

NOTE

Align notches on bonnet and barrel with slot on gear segment.

e. Installation. Install fuel injection pump (para 3-93).

6-20. Fuel Injection Pump Housing Assembly

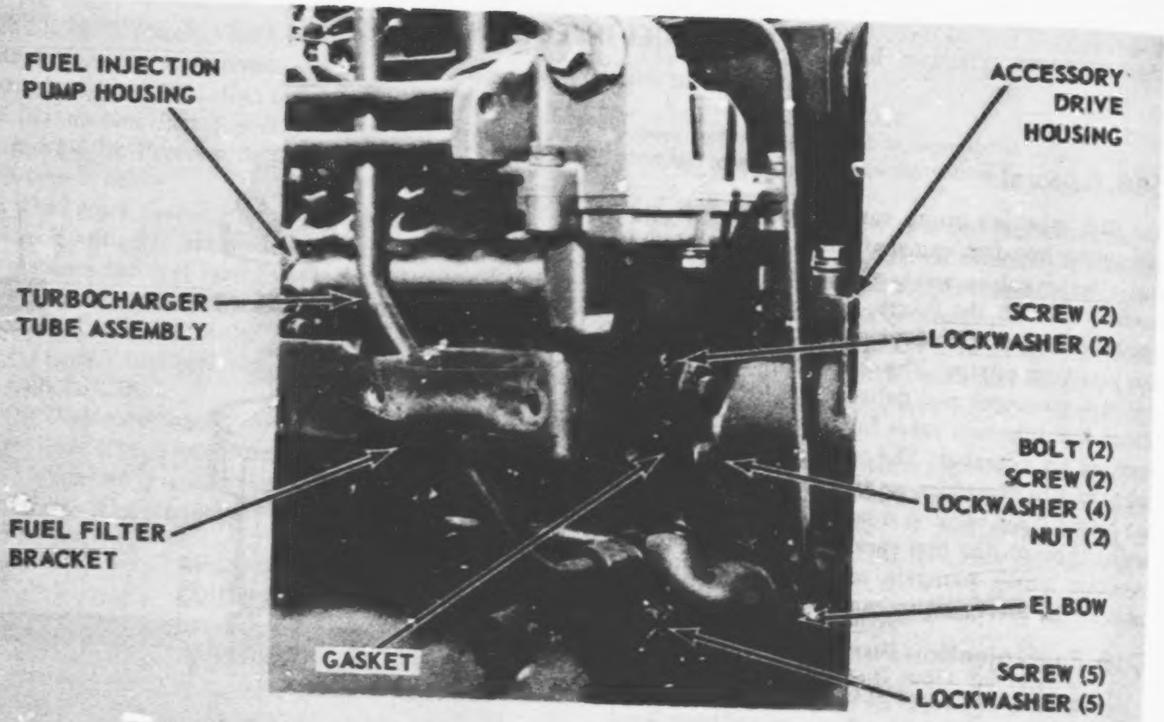
a. Removal.

(1) Remove final fuel filter assembly (para 3-98).

(2) Remove fuel pump starting tank (para 3-99).

(3) Remove governor assembly (para 6-17).

(4) Remove fuel injection pump housing assembly as shown in figure 6-19.


FUEL INJECTION PUMP HOUSING
ACCESSORY DRIVE HOUSING
TURBOCHARGER TUBE ASSEMBLY
SCREW (2)
LOCKWASHER (2)
BOLT (2)
SCREW (2)
LOCKWASHER (4)
NUT (2)
FUEL FILTER BRACKET
ELBOW
GASKET
SCREW (5)
LOCKWASHER (5)
ME 4310-338-15/6-19

REMOVAL

STEP 1. DISCONNECT TURBOCHARGER LUBRICATION TUBE ASSEMBLY.

STEP 2. REMOVE SCREWS AND LOCKWASHERS FROM ELBOW.

STEP 3. REMOVE SCREWS, BOLTS, NUTS, AND LOCKWASHERS. REMOVE FUEL INJECTION PUMP HOUSING, ELBOW, GASKET, AND FILTER BRACKET.

INSTALLATION

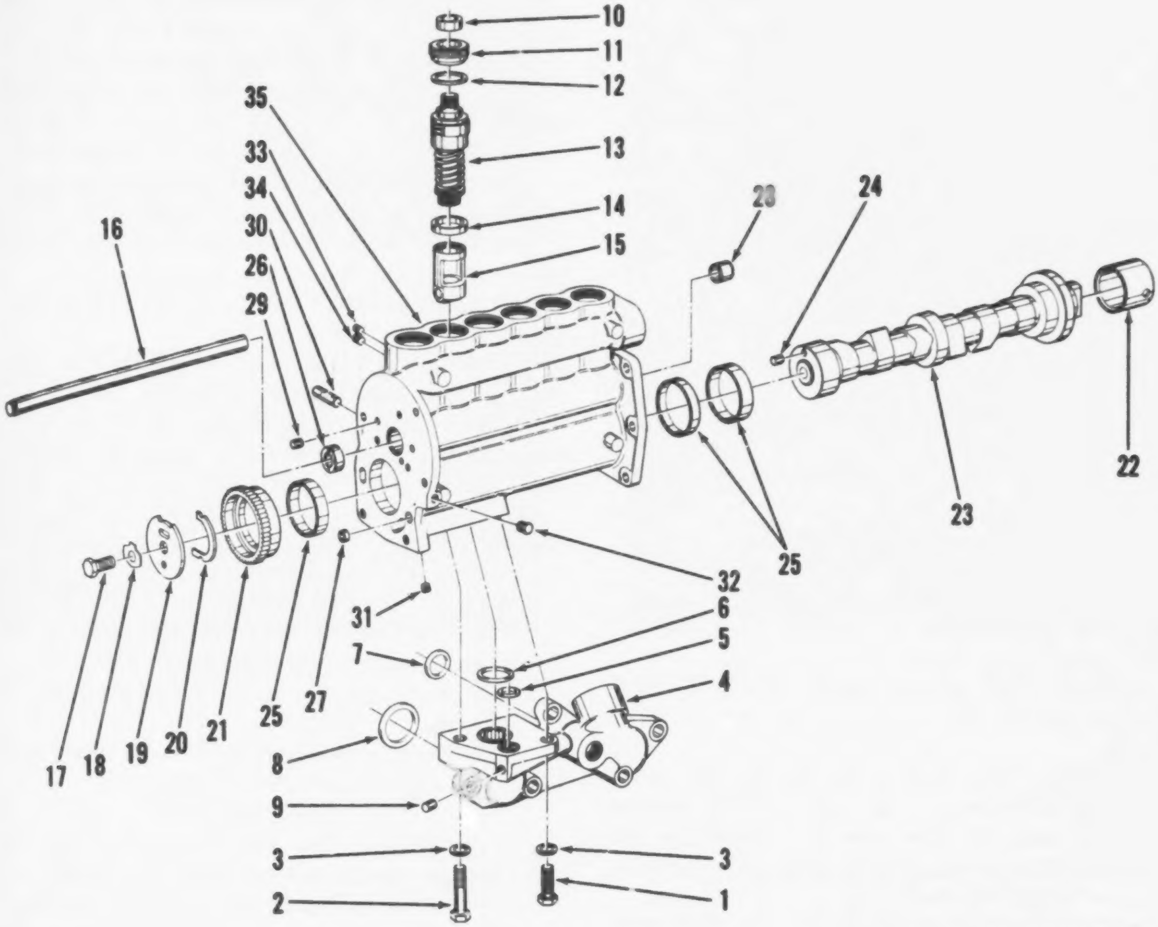
STEP 1. INSTALL GASKET. PLACE FUEL INJECTION PUMP HOUSING, FILTER BRACKET, AND ELBOW IN MOUNTING POSITION. SECURE WITH SCREWS, BOLTS, NUTS, AND LOCKWASHERS.

STEP 2. SECURE ELBOW WITH SCREWS AND LOCKWASHERS.

STEP 3. CONNECT TURBOCHARGER LUBRICATION TUBE ASSEMBLY.

Figure 6-19. Fuel injection pump housing assembly; removal and installation.

b. Disassembly. Disassemble fuel injection pump housing assembly in numerical sequence shown in figure 6-20.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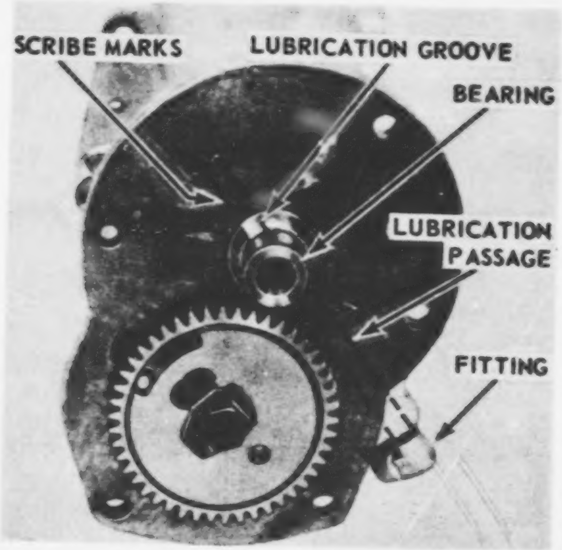
1. Screw
2. Screw
3. Washer (2)
4. Elbow
5. O-ring
6. O-ring
7. O-ring
8. O-ring
9. Dowel pin
10. Washer (6)
11. Bushing (6)
12. Gasket (6)
13. Pump assembly (6)
14. Spacer (6)
15. Lifter assembly (6)
16. Fuel rack
17. Screw
18. Lock
19. Plate
20. Spring
21. Gear
22. Sleeve
23. Camshaft
24. Dowel pin
25. Bearing (3)
26. Bearing
27. Plug
28. Bearing
29. Dowel pin (2)
30. Pin (3)
31. Plug
32. Plug
33. Dowel pin (6)
34. Dowel pin (6)
35. Housing

Figure 6-20. Full injection pump housing assembly disassembly and reassembly (sheet 1 of 2).



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B

figure 6-20. Fuel injection pump housing assembly disassembly and reassembly (sheet 2 of 2).

(1) Refer to paragraph 6-19 for disassembly, service, and reassembly instructions for fuel injection pumps.

(2) When removing fuel rack bearings, first make two scribe marks on housing above groove on bearing (fig. 6-20, view B). This procedure allows for the alignment of groove on bearing with drilled lubrication passage during reassembly.

(3) Wire together each spacer and fuel pump lifter. Tag each pair and identify the pump bore from which they were removed.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thouroughly. Discard all gaskets and seals.

(2) Inspect fuel injection pump lifters for cracks, breaks, distortion, or any other defect.

NOTE

Whenever a fuel injection pump lifter is replaced, it is also necessary to replace the associated fuel injection pump plunger.

(3) Inspect fuel rack for damaged threads, distortion, cracks, or any other defect.

(4) Inspect fuel rack bearings for cracks, breaks, or any other defect. Measure bearing bores and clearances. Each bore should measure 0.5007 to 0.5013 inches; each clearance is 0.005 inches maximum.

(5) Inspect camshaft for cracks, distortion, or any other defect.

(6) Inspect camshaft bearings for cracks, breaks, or any other defect. Measure bearing bores and clearances. Each bore should measure 1.8750 to 1.8760 inches; each clearance is 0.010 inches maximum.

(7) Inspect all other parts, including attaching hardware, for cracks, breaks, distortion, or any other defect.

d. Reassembly. Reassemble fuel injection pump housing in reverse numerical sequence shown in figure 6-20. Install new gaskets and seals.

(1) All assembly should be done with clean hands and on a clean, lint free cloth.

(2) Install camshaft bearing so that hole in bearing aligns with passage in housing.

(3) Install fuel rack bearing so that groove in bearing aligns with scribe marks on housing.

(4) Use fuel rack setting gage when installing fuel rack. See figure 3-76. Position fuel rack so that gage indicates .000".

(5) Install each fuel injection pump so that notches engage with two locating dowel pins in each housing bore. Use an extractor tool.

CAUTION

When tightening retaining bushing, a lesser torque value will allow pump to leak; a greater torque value can damage housing.

(6) Tighten each pump retaining bushing to a torque value of 140 to 160 foot-pounds.

CAUTION

A misaligned fuel injection pump can cause an engine to overspeed with resultant damage to engine, turbocharger, and compressor.

(7) After pumps are installed, check fuel rack setting. With fuel rack at extreme fuel on position, rack setting gage should indicate +.312" minimum. If reading is less than +.312", remove pump assemblies, position fuel rack to .000", and reinstall pumps. Recheck extreme fuel on rack position.

e. Installation.

(1) Install fuel injection pump housing assembly as shown in figure 6-19.

(2) Install governor assembly (para 6-17).

(3) Install fuel pump starting tank (3-99).

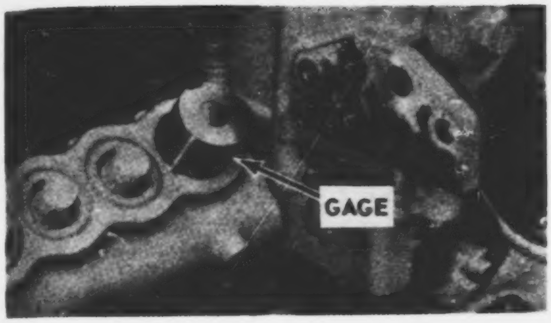
(4) Install final fuel filter assembly (para 3-98).

f. Fuel Injection Pump Timing Dimension Check and Adjustment — On Engine fig. 6-21).

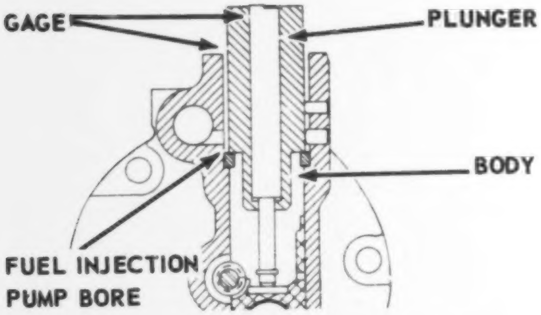
(1) Remove valve cover (para 3-116.

(2) Remove timing pointer cover from flywheel housing (fig. 3-103).

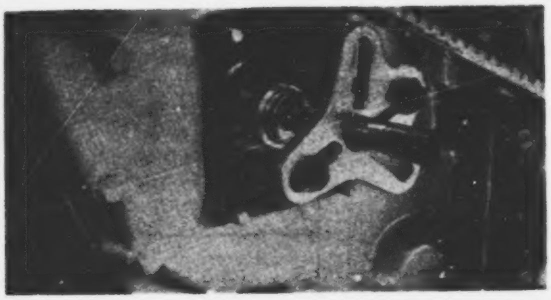
(3) Remove fuel injection pump for cylinder No. 1 (para 3-93).



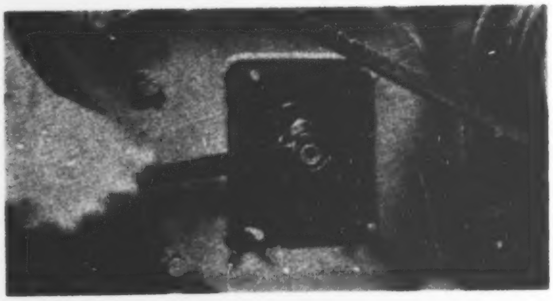
FUEL PUMP LIFTER GAGE INSTALLED



FUEL PUMP LIFTER GAGE INSTALLED



SEPARATING GEAR



ROTATING THE ACCESSORY DRIVE SHAFT

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Figure 6-21. Fuel injection timing; on engine.

(4) Rotate crankshaft counterclockwise (as viewed from flywheel end) at least 60°. Continue rotating crankshaft counterclockwise until TC1-6 CYL mark on flywheel is aligned with timing pointer and both the inlet and exhaust valves of cylinder No. 1 are closed.

(5) Install gage in pump bore. Measure timing dimension using a depth micrometer. Timing dimension should be 4.2159 to 4.2199 inches. If timing dimension is correct, proceed to step 10. If timing dimension is not correct, proceed to step 6 and make an adjustment.

(6) Remove small cover from front of timing gear cover and loosen accessory drive gear retaining nut (do not remove nut).

(7) Separate gear from accessory drive shaft. Remove gear pulling tools.

(8) Turn accessory drive shaft extension nut counterclockwise and adjust timing dimension. Timing dimension should be 4.2159 to 4.2199 inches.

(9) Install accessory drive gear. Tighten retaining nut to 100 ± 10 foot-pounds. Recheck timing dimension. Replace cover.

(10) Install fuel injection pump for cylinder No. 1 (para 3-93).

(11) Install timing pointer cover on flywheel housing (fig. 3-103).

(12) Install valve cover (para 3-116).

g. Fuel Injection Pump Timing Dimension Check and Adjustment — Off Engine (fig. 6-22).

(1) Install pointer assembly on fuel injection pump housing.

(2) Install timing plate on drive end of fuel injection camshaft.

(3) Remove fuel injection pump for cylinder being checked (para 3-93). Install gage in pump bore.

(4) Refer to Table 6-1 and select the timing plate degree setting for lifter being checked. Rotate timing plate counterclockwise until proper degree setting aligns with pointer assembly. Tighten screw to lock in position.

(5) Measure timing dimension using a depth micrometer. Timing dimension should be 4.2670 to 4.2680 inches. If timing dimension is correct, proceed to step 7. If timing dimension is not correct, proceed to step 6.

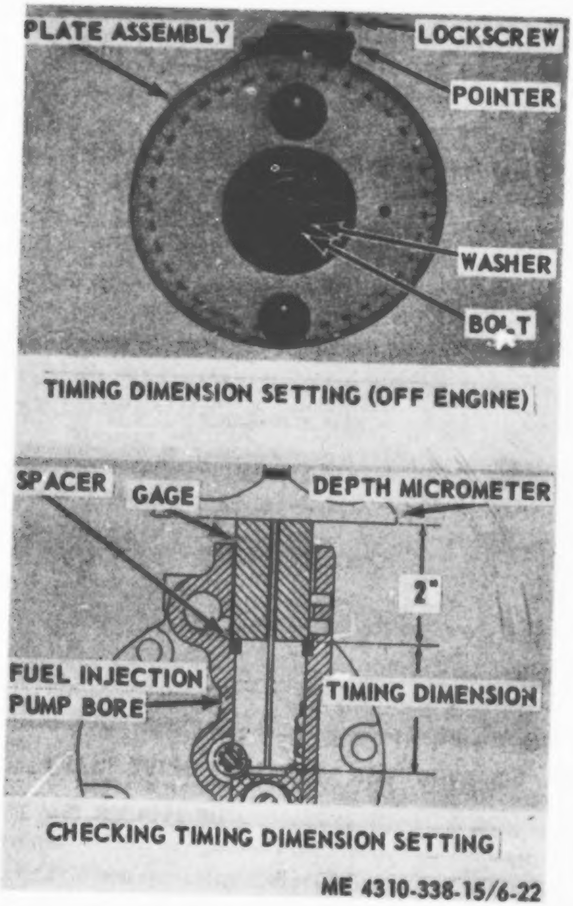


Figure 6-22. Fuel injection timing; off engine.

(6) If timing dimension is not correct, replace spacer (1). Select a spacer thickness which will correct the timing dimension. Spacers are available in varying thicknesses from 0.170" to 0.198". Recheck timing dimension.

(7) Install fuel injection pump (para 3-93).

(8) If timing dimension is to be checked for each cylinder, repeat steps 1 through 7 following firing order of engine.

Table 6-1. Timing Plate Degree Settings

Lifter number (numbered consecutively from to rear)	Timing plate degrees
1	170° 30'
2	59° 30'
3	299° 30'
4	119° 30'
5	239° 30'
6	359° 30'

Section X. OIL COOLER AND OIL FILTER GROUP

6-21. General

The oil cooler and oil filter group consists of the oil cooler assembly, oil filter assembly, a water bonnet, and associated tubing and connections. The oil cooler assembly contains a tube bundle, two bypass valves, and a housing. The oil filter assembly consists of two filter elements, two cases, two bypass valves, and a base assembly. On cold engine starts, the cool viscous oil does not flow immediately through the oil cooler and oil filter. The cool oil forces bypass valves, located on the oil filter and oil cooler, to open and the oil flows unrestricted through the engine. As the temperature of the oil increases, the viscosity and pressure of the oil decreases and the oil filter bypass valves close. Now, only filtered oil is delivered to all of the engine parts. As oil temperature continues to increase, the oil cooler bypass valves close, allowing the oil to flow through the oil cooler prior to entering the oil filters. If an oil filter becomes clogged, that oil filter bypass valve opens and allows the oil to flow directly from the oil cooler into th engine. Water from the engine cooling system flows through the tube bundle section of the oil cooler to reduce the heat of the engine lubricationg oil

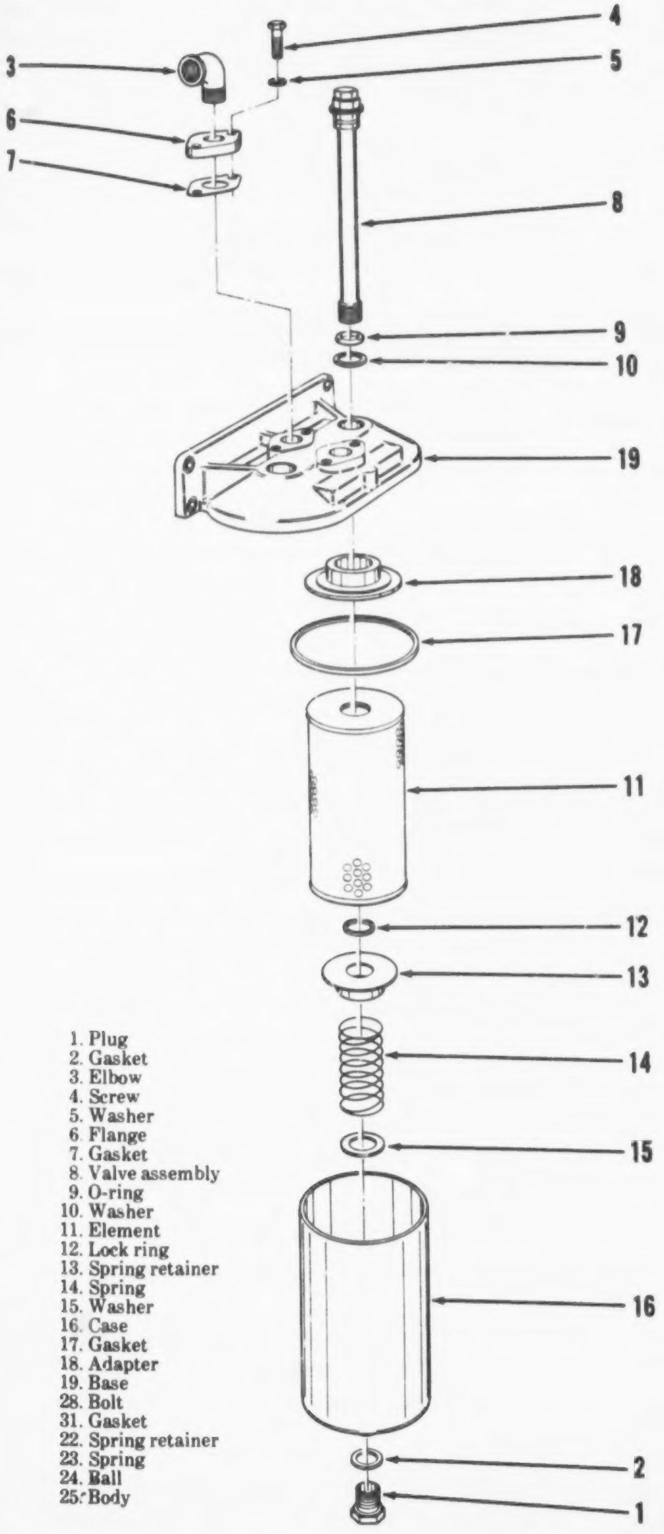
6-22. Oil Filter Assembly

a. Removal. Remove oil filter assembly (para 3-108).

NOTE

Before removing filter assembly, drain all oil from cases.

b. Disassembly. Disassemble oil filter assembly assembly in numerical sequence shown in figure 6-23.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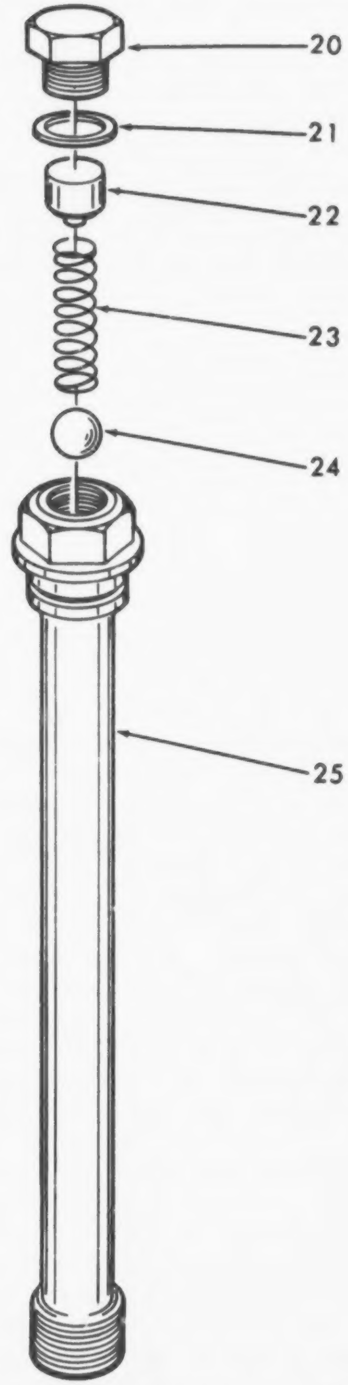
ME 4310-338-15/6-23 ①

1. Plug
2. Gasket
3. Elbow
4. Screw
5. Washer
6. Flange
7. Gasket
8. Valve assembly
9. O-ring
10. Washer
11. Element
12. Lock ring
13. Spring retainer
14. Spring
15. Washer
16. Case
17. Gasket
18. Adapter
19. Base
28. Bolt
31. Gasket
22. Spring retainer
23. Spring
24. Ball
25. Body

Figure 6-23. Engine oil filter assembly, disassembly and reassembly (sheet 1 of 2).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ME 4310-338-15/6-23 ②

Figure 6-23. Engine oil filter assembly, disassembly and reassembly (sheet 2 of 2).

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard elements and gaskets.

(2) Inspect springs for defective coils, cracks, breaks, or any other defect.

(3) Inspect relief valve parts for cracks, breaks, distortion, or any other defect.

(4) Inspect all other parts for cracks, breaks, distortion, or any other defect.

(5) Inspect plugs and attaching parts for damaged threads, distortion, or any other defect.

d. Reassembly. Reassemble oil filter assembly in reverse numerical sequence shown in figure 6-23. Install new elements and gaskets.

e. Installation. Install oil filter assembly (para 3-108).

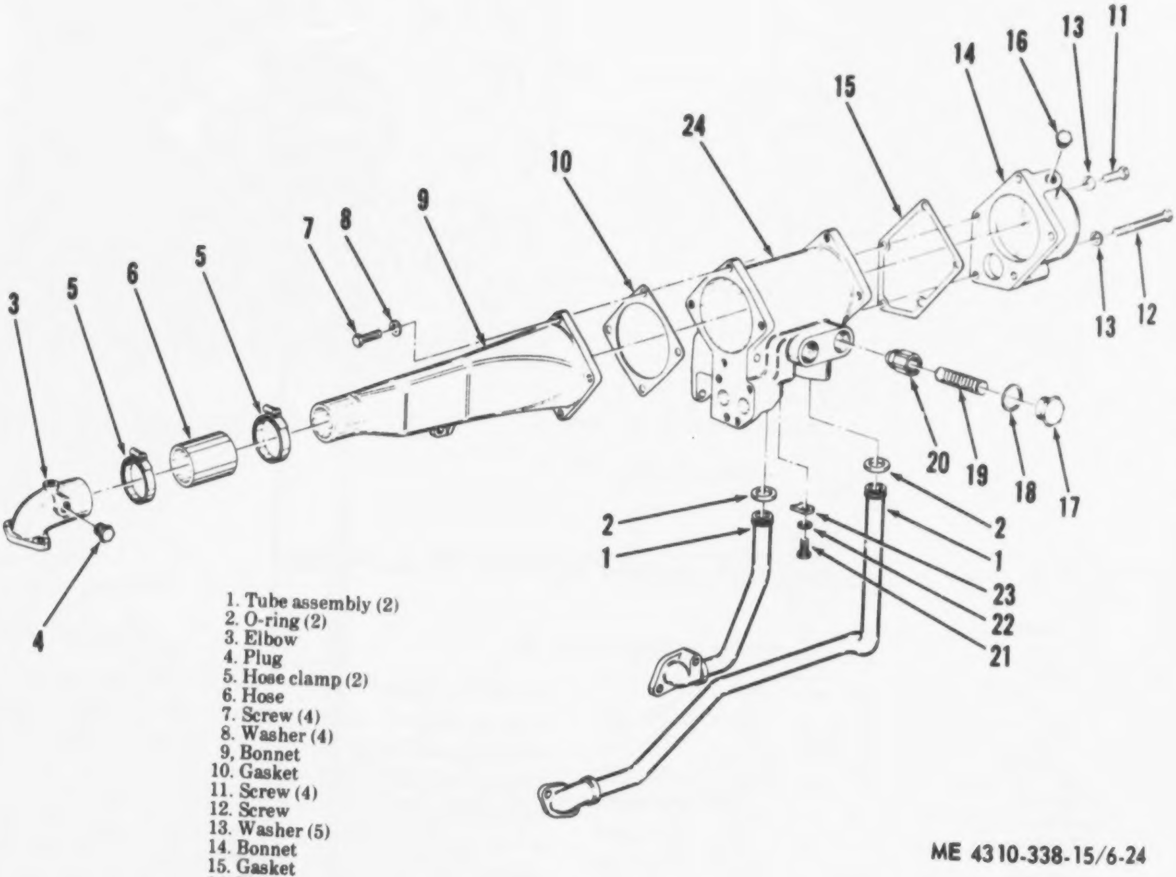
-23. Oil Cooler Group

a. Removal.

(1) Remove oil filter assembly (para 3-108).

(2) Remove oil cooler group as shown in figure 3-95.

b. Disassembly. Disassemble oil cooler in numerical sequence shown in figure 6-24.



1. Tube assembly (2)
2. O-ring (2)
3. Elbow
4. Plug
5. Hose clamp (2)
6. Hose
7. Screw (4)
8. Washer (4)
9. Bonnet
10. Gasket
11. Screw (4)
12. Screw
13. Washer (5)
14. Bonnet
15. Gasket
16. Plug
17. Plug (2)
18. Gasket (2)
19. Spring (2)
20. Plunger (2)
21. Screw (2)
22. Washer (2)
23. Lug (2)
24. Oil cooler

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Figure 6-24. Engine Oil Cooler; Disassembly and Reassembly.

c. Cleaning, Inspection, and Repair.

(1) Discard all gaskets and o-rings.

(2) Clean all metal parts using a cleaning solvent that is in accordance with P-D-680. Dry parts thoroughly.

(3) If tube bundle is corroded, scale deposits can be removed by either of the following methods:

(a) Ream tubes with a drill bit welded to end of rod long enough to penetrate length of tubes. Extreme care must be taken to avoid piercing sides of tubes with drill bit.

WARNING

Use extreme caution when mixing acid solution and when cleaning oil cooler. Always add acid to water when mixing; never add water to acid. Avoid any contact of solution with skin. Keep away from eyes.

(b) Clean tubes with a solution of 15% hydrochloric acid and 85% water. The oil cooler should be immersed in or flushed with the solution until the scale is softened. Wash cooler thoroughly with water to remove scale and solution. Repeat procedure as necessary to achieve proper cleaning.

(4) Inspect tube bundle for cracks, breaks, uncleanable corrosion, or any other defect.

(5) Inspect bonnets for cracks, breaks, uncleanable corrosion, or any other defect.

(6) Inspect tube assembly for cracks, breaks, damaged fittings, or any other defect.

(7) Inspect attaching hardware for damaged threads, distortion, or any other defect.

d. Reassembly. Reassemble oil cooler group in reverse numerical sequence shown in figure 6-24, adding new gaskets and O-rings.

e. Installation.

(1) Install oil cooler group as shown in figure 3-95.

(2) Install oil filter assembly (para 3-108).

Section XI. WATER PUMP ASSEMBLY

6-24. General

The centrifugal-type water pump is driven by the accessory drive gear train. Basically, the pump consists of an impeller and drive gear mounted on a common rotating shaft. The shaft is supported by roller bearings. Seals mounted on the shaft prevent water from leaking into the gear section and oil from leaking into the impeller section. The pump is contained in a cast housing. As the diesel engine is running, the drive gear in the water pump turns the shaft and impeller. The impeller creates a forceful flow of water throughout the engine cooling system.

6-25. Water Pump Assembly

a. Removal. Remove water pump assembly (para 3-76).

b. Disassembly. Disassemble water pump assembly in numerical sequence shown in figure 6-25.

(1) Remove impeller by unscrewing it in a clockwise direction.

CAUTION

When pressing shaft and bearing out of housing, place a nut on end of shaft to protect threads.

(2) Press shaft and bearing out of housing. Press from impeller end. Do not remove bearing from shaft unless bearing or shaft is being replaced. If an inspection reveals that bearing or shaft is defective, press bearing off of shaft.

(3) Press water seal out of impeller end of housing.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts with a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard all seals, gaskets and O-rings.

(2) Inspect bearings for freedom of movement, grittiness, cracks, distortion, or any other defect.

(3) Inspect shaft for distortion, cracks, pits, or any other defect.

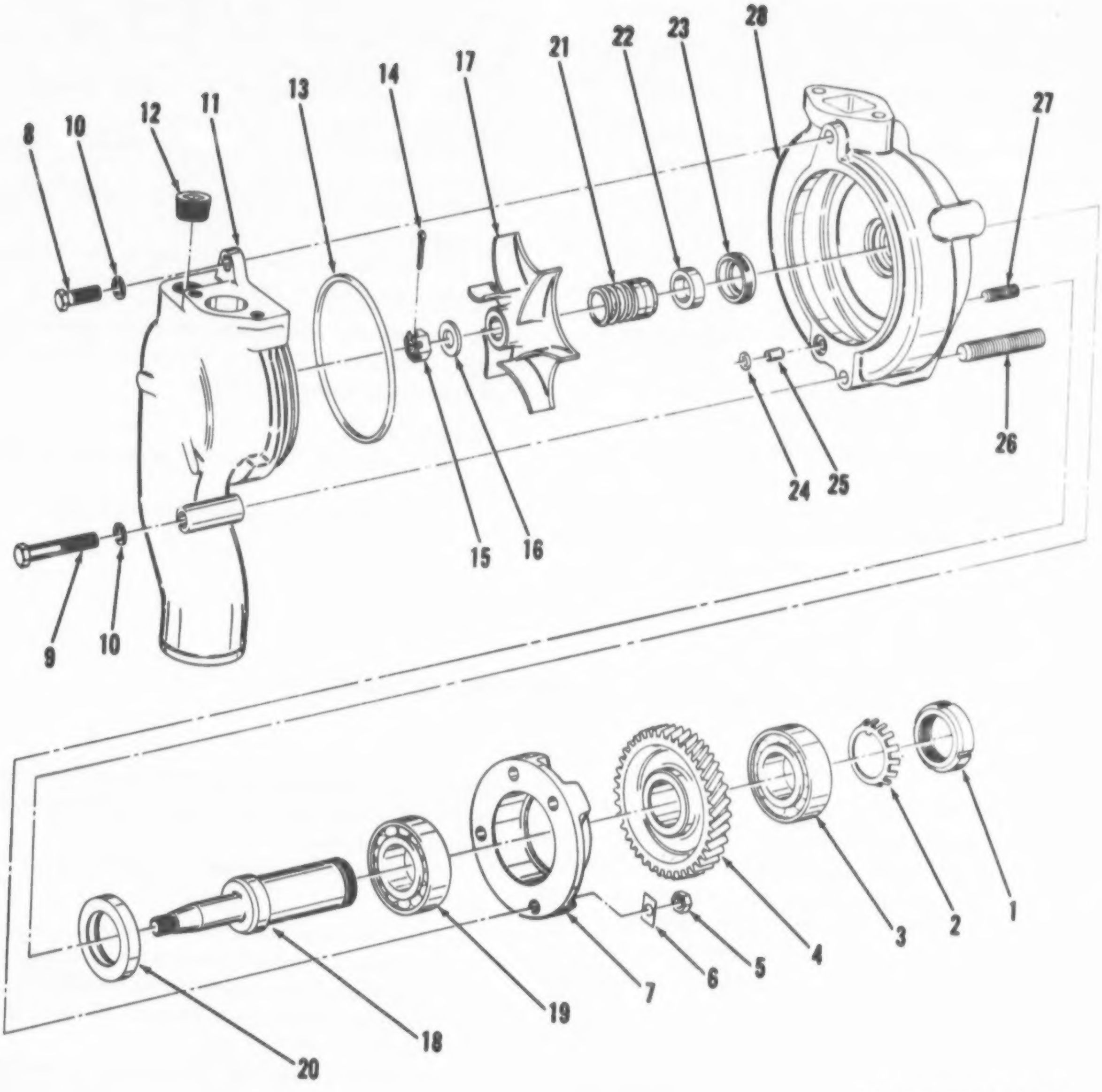
(4) Inspect gear and impeller for nicks, distortion, cracks, or any other defect.

(5) Inspect all other parts for cracks, breaks, distortion, or any other defect.

(6) Inspect attaching hardware for damaged threads, distortion, cracks, or any other defect.

d. Reassembly. Reassemble water pump assembly in reverse numerical sequence shown in figure 6-25. Install new seals, o-rings, and gaskets.

(1) Press oil seal into pump housing with lip facing drive end. Lightly lubricate sealing lip using engine lubricant.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ME 4310-338-15/6-25

1. Nut
2. Lock
3. Bearing
4. Gear
5. Nut (4)
6. Lock (4)
7. Bearing cage
8. Screw
9. Screw
10. Washer (2)
11. Cover
12. Plug
13. O-ring
14. Cotter pin
15. Nut
16. Washer
17. Impeller
18. Shaft
19. Bearing
20. Seal
21. Seal assembly
22. Washer
23. Seal ring
24. O-ring
25. Sleeve
26. Stud
27. Stud
28. Housing

Figure 6-25. Water pump assembly; disassembly and reassembly.

(2) If bearing is being replaced, press bearing onto shaft. Press shaft and bearing assembly into housing.

(3) Install water seal using an installation tool and hand pressure. Place ceramic ring and rubber cap onto shaft and seat into housing. Press rubber bellows-carbon washer assembly on pump until carbon washer contacts ceramic rings.

(4) Install impeller by screwing it onto shaft in a counterclockwise direction. Tighten impeller retaining nut to a torque value of 25 to 35 foot-pounds. Measure clearance between impeller vanes and pump housing. Clearance should be 0.010 to 0.030 inches. Reassemble water pump, as necessary, to achieve proper clearance.

(5) Press drive gear and bearing onto shaft.

e. Installation. Install water pump assembly (para 3-76).

Section XII. CYLINDER HEAD AND VALVE MECHANISM GROUP

6-26. General

The cylinder assembly houses the valves, valve mechanism, precombustion chambers, glow plugs, and fuel injection valves. The air inlet manifold is cast integral with the cylinder head. Rubber seals and ferrules seal the water and lubrication passages between the cylinder head and cylinder block. Cored passages in the cylinder head direct the flow of coolant around the valve ports and precombustion chambers. The valves and valve mechanism admit inlet air and release exhaust gases at precisely timed intervals during each cycle of a piston. The camshaft, geared and timed to the crankshaft, rotates at one-half crankshaft RPM. he camshaft activates the rocker arms and valves through mechanical lifters and push rods. Valve clearances are adjusted by turning a screw on each rocker arm. Each valve spring has a mechanism which allows that valve to rotate a few degrees each time the valve is lifted. This action minimizes carbon deposits and promotes longer valve life. The cylinder head contains valve seat inserts which can be replaced when the seats have been reground to the extreme dimensional limits.

6-27. Cylinder Head and Valve Mechanism

a. Removal.

(1) Remove housing front doors and roof (para 3-33).

(2) Remove turbocharger assembly and manifold (para 3-115 and 3-118).

(3) Drain cooling system. Remove hoses and tube assembly (para 3-71).

(4) Remove fuel injection lines and valves (para 3-100 and para 3-94). Install caps or plugs where lines were removed to prevent dirt from entering fuel injection system.

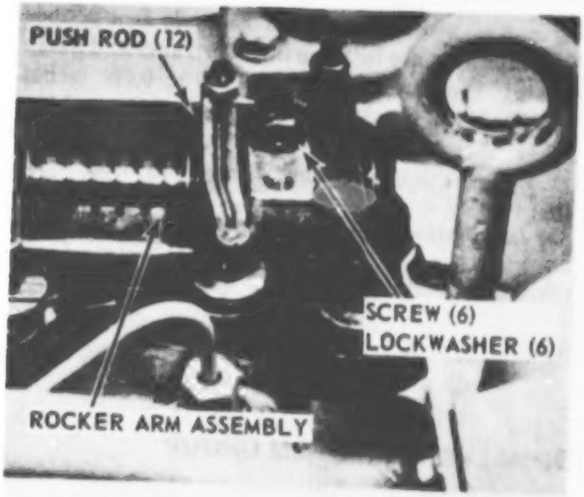
(5) Disconnect wiring from water temperature safety switch and glow plugs. Remove glow plugs (para 3-119).

(6) Remove water temperature sensing bulb (fig. 3-34).

(7) Remove cold weather starting aid atomizer (fig. 3-32).

(8) Remove valve cover (para 3-116).

(9) Remove rocker arm assembly and push rods as shown in figure 6-26.



REMOVAL

ME 4310-338-15/6-26 ①

STEP 1. REMOVE SCREWS AND LOCKWASHERS. REMOVE ROCKER ARM ASSEMBLY.

STEP 2. REMOVE PUSH RODS.

INSTALLATION

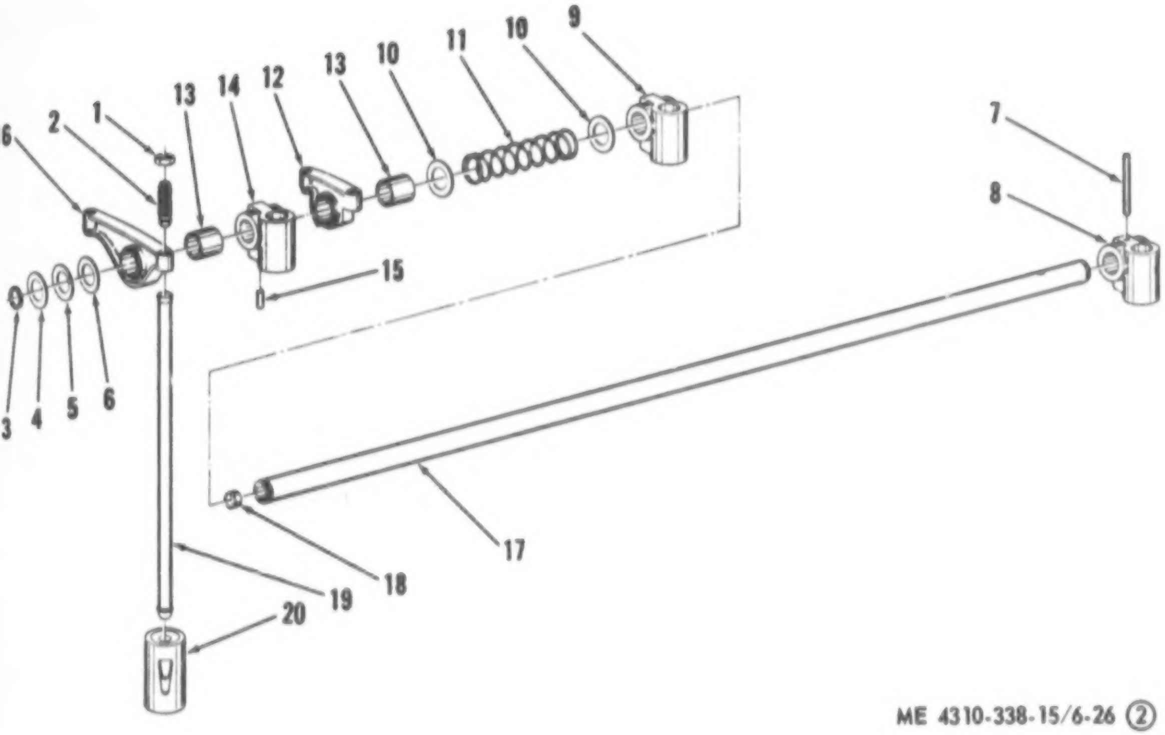
STEP 1. INSTALL PUSH RODS. BE SURE RODS SEAT IN LIFTERS.

STEP 2. PLACE ROCKER ARM ASSEMBLY IN MOUNTING POSITION AND SECURE WITH SCREWS AND LOCKWASHERS.

A

Figure 6-26. Rocker arms and push rods, removal and installation (sheet 1 of 2).

1. Nut (12)
2. Screw (12)
3. Retaining ring (2)
4. Washer
5. Spring (2)
6. Washer (2)
7. Dowel pin
8. Bracket
9. Bracket (4)
10. Washer (12)
11. Spring (5)
12. Arm assembly (6)
13. Bearing (12)
14. Bracket
15. Dowel pin
16. Arm assembly (6)
17. Shaft
18. Plug (2)
19. Push rod (12)
20. Lifter (12)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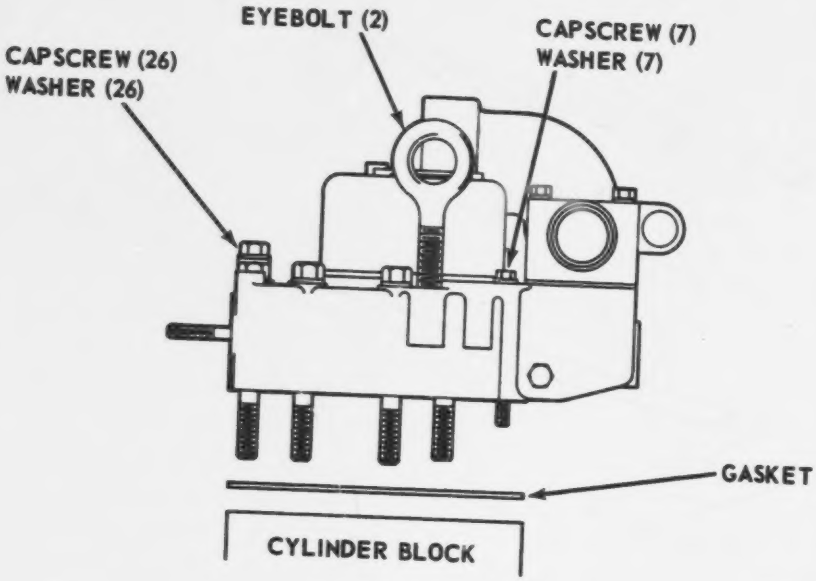
ME 4310-338-15/6-26 ②

Figure 6-26. Rocker arms and push rods, removal and Installation (sheet 2 of 2).

(10) Remove cylinder head as shown in figure 6-27.



ME 4310-338-15/6-27

REMOVAL

STEP 1. REMOVE CYLINDER HEAD CAPSCREWS AND WASHERS.

STEP 2. CONNECT LIFTING DEVICE TO EYEBOLTS AND REMOVE CYLINDER HEAD FROM CYLINDER BLOCK.

NOTE

BE CERTAIN THAT FERRULES AND SEALS STICKING TO CYLINDER HEAD DO NOT FALL INTO CYLINDER BLOCK.

STEP 3. REMOVE CYLINDER HEAD GASKET AND CLEAN SEALING SURFACE ON CYLINDER BLOCK.

INSTALLATION

STEP 1. INSTALL NEW GASKET ON CYLINDER BLOCK.

STEP 2. CONNECT LIFTING DEVICE TO EYEBOLTS AND LOWER CYLINDER HEAD ONTO CYLINDER BLOCK.

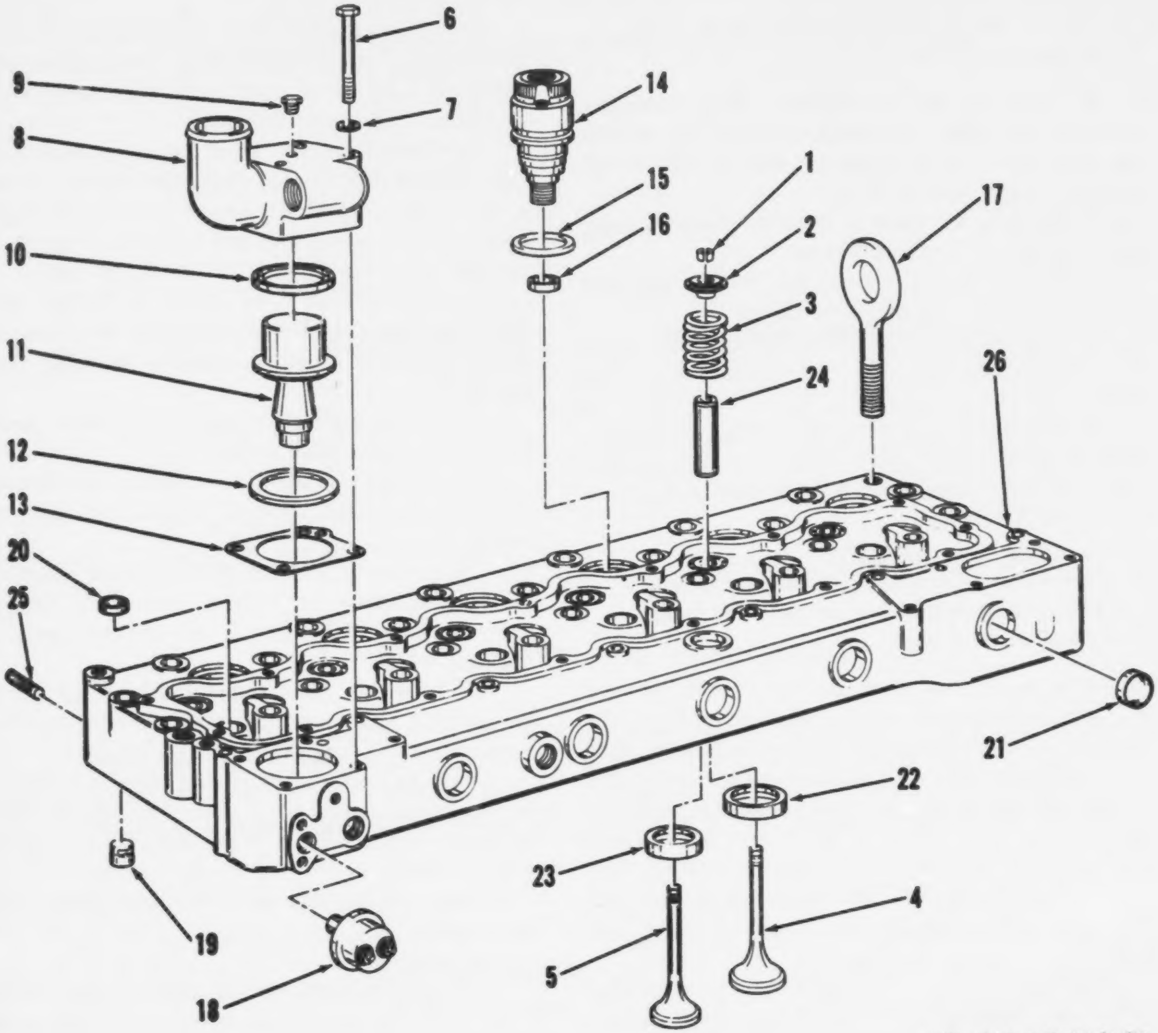
STEP 3. SECURE CYLINDER HEAD WITH CAPSCREWS AND WASHERS. REFER TO TABLE 5-4 FOR TORQUE DATA WHEN TIGHTENING CAPSCREWS.

NOTE

USE AN ANTISEIZE COMPOUND ON CYLINDER HEAD CAPSCREWS.

Figure 6-27. Cylinder head and valve mechanism; removal and installation.

b. Disassembly. Disassemble cylinder head and valve mechanism in numerical sequence shown in figure 6-28.



ME 4310-338-15/6-28

1. Retaining lock (24)
2. Rotocoil assembly (12)
3. Spring (12)
4. Inlet valve (6)
5. Exhaust valve (6)
6. Screw (4)
7. Washer (4)
8. Housing assembly
9. Plug
10. Seal
11. Temperature regulator
12. Washer
13. Gasket
14. Precombustion chamber (6)
15. O-ring (6)
16. Gasket (6)
17. Lifting eye (2)
18. Water temperature safety switch
19. Water director (18)
20. Plug (6)
21. Plug (8)
22. Insert (6)
23. Insert (6)
24. Bushing (12)
25. Stud (12)
26. Cylinder head

Figure 6-28. Cylinder Head and Valve Mechanism; Disassembly and Reassembly.

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c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard all gaskets, seals, and O-rings.

CAUTION

Do not use a wire brush or wheel when cleaning any part.

(2) Place valves, valve stems, valve bushings, retainers, and locks in solvent and soak for at least one hour. Use a stiff brush and remove all carbon, lacquer, or residue from parts.

(3) Be sure all scale is removed from cylinder head. Use solvent and a stiff brush.

(4) Inspect cylinder head for cracks, damaged threads, distortion, or any other defect.

(5) Inspect precombustion chambers and glow plugs for damaged threads, distortion, or any other defect.

(6) Inspect valves for cracks, pitting, distortion, excessive wear, or any other defect. Use a micrometer and check valve stem wear. Stem diameter should be 0.3712 to 0.3722 inches.

CAUTION

Use extreme care if valve seats are ground. Too much material can be removed quickly and inadvertently.

(7) Coat each valve face with a thin film of Prussian blue, then rotate each valve in associated valve seat Remove valves and examine contact pattern on each valve and valve seat. A line of contact near top and around entire circumference of valve seat indicates line contact with valve. If necessary, grind valve seats using a valve seat grinding tool. After valve seats have been ground until they are smooth and concentric with valve guides, clean all parts thoroughly.

(8) If valves and valve seats have been ground for proper seating, the dimensional specifications shown in figure 6-29 must be met. If dimensions are unacceptable, valves and valve seat inserts must be replaced.

(9) Inspect valve guides for cracks, distortion, excessive wear, or any other defect. Check inside diameter of guides by inserting various pilots or gages through guides and measuring outside diameter of largest pilot that passes through each guide. This measurement represents the guide inside diameter which should be 0.3736 to 0.3756 inches. Acceptable valve stem clearance in each guide 0.0045 inches maximum.

(10) Inspect valve springs for damaged coils, cracks, distortion, or any other defect. Check spring force; compass each spring to a length of 1.766 inches. Force required for compression should be 54.8 to 60.6 pounds. Refer to table 5-2 for spring free length.

(11) Inspect valve lifters for cracks, distortion, excessive wear, or any other defect. Measure diameter of each valve lifter. This measurement should be 1.3100 to 1.3110 inches.

(12) Inspect valve lifter bores in cylinder head for scoring, chips, excessive wear, or any other defect. Measure diameter of each bore. This measurement should be 1.3135 to 1.3155 inches.

(13) Inspect rocker arms, bearings, spring, and shaft. Check for cracks, distortion, excessive wear, or any other defect. Measure diameter of bearing bore on each rocker arm and diameter of shaft. The bearing bore should be 0.7260 to 0.7266 inches. The shaft diameter should be 0.7240 to 0.7250 inches. Measure clearance between shaft and bearings. Shaft-to-bearing clearance should be 0.008 inches maximum.

(14) Inspect all other parts for cracks, breaks, distortion, or any other defect.

(15) Inspect attaching hardware for damaged threads, distortion, cracks, breaks, or any other defect.

d. Reassembly. Reassemble cylinder head and valve mechanism in reverse numerical sequence shown in figure 6-28. Install new gaskets, seals, and O-rings.

(1) Lubricate valve stems and bushings prior to installation. Valve heads are marked on top for identification: i.e., EX for exhaust and IN for inlet.

(2) Install valve springs with painted end up and be sure bushing seals are in place. Tap retainer lightly as spring compressor is being removed to help seat locks properly.

(3) Install any new valve bushings using a bushing driver.

e. Installation.

(1) Install cylinder head as shown in figure 6-27.

(a) Rock head gently until it seats flat on head gasket.

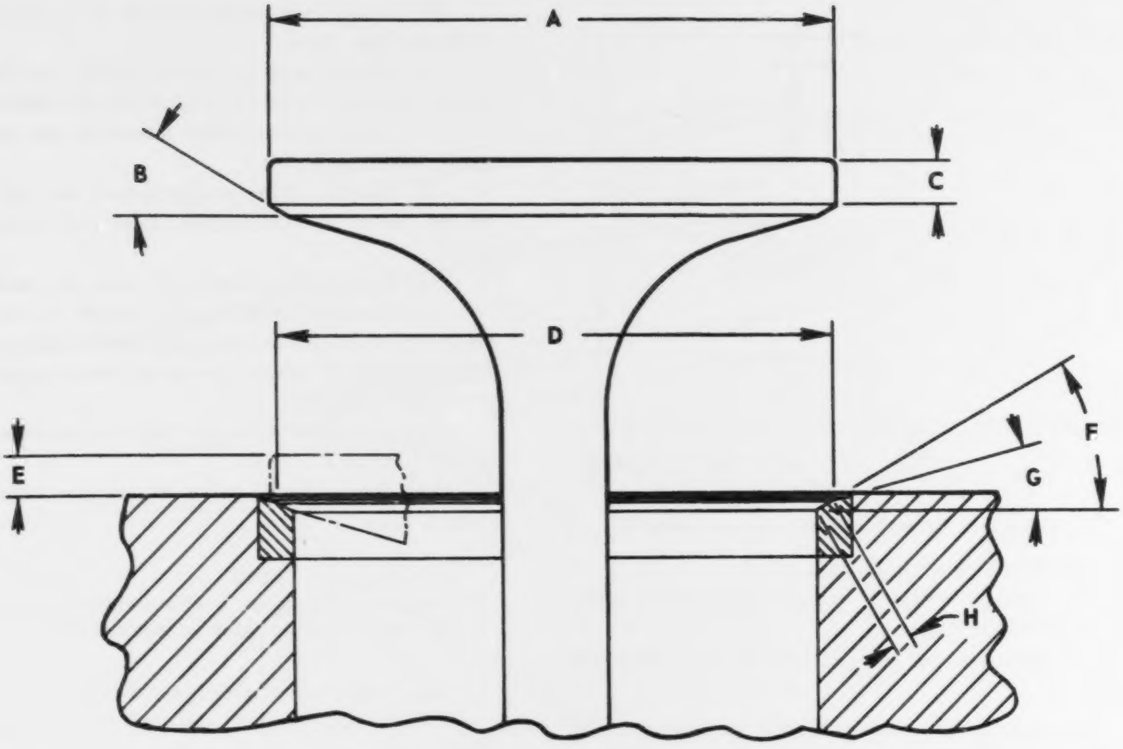
(b) Align opening in each water director with "V" mark on cylinder head.

(c) Cylinder head gasket must be clean and dry at time of installation.

(2) Install push rods and rocker arm assembly as shown in figure 6-26. Tighten capscrews to a torque value of 170 to 180 foot-pounds.

(3) Make preliminary valve clearance adjustment. Adjust clearance for each exhaust valve to 0.028 inches and each inlet valve to 0.015 inches. Refer to paragraph 3-117 for valve adjusting procedure.

(4) Each precombustion chamber must be installed so that the glow plug will be clear of fuel lines or other points of interference. To accomplish



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VALVE AND VALVE SEAT SPECIFICATIONS

A – VALVE HEAD DIAMETER. B – VALVE FACE ANGLE. C – MINIMUM VALVE LIP THICKNESS. D – OUTSIDE DIAMETER OF VALVE SEAT FACE. E – CLOSED VALVE PROJECTION. F – VALVE SEAT FACE ANGLE. G – ANGLE TO GRIND INSERT SEAT FACE TO REDUCE MAXIMUM SEAT DIAMETER. H – MAXIMUM PERMISSIBLE VALVE SEAT WIDTH.

	INLET	EXHAUST
A	2.025/2.015 INCHES	1.901/1.891 INCHES
B	29-1/4 DEGREES	29-1/4 DEGREES
C	0.057 INCHES	0.070 INCHES
D	1.984/1.934 INCHES	1.860/1.810 INCHES
E	0.138 INCHES	0.128 INCHES
F	30 DEGREES	30 DEGREES
G	15 DEGREES	15 DEGREES
H	0.095 INCHES	0.095 INCHES

Figure 6-29. Valve and valve seat dimensions.

this, the precombustion chamber gaskets are supplied in three different thicknesses. Proper positioning is achieved using the fixed chamber tightening torque value and the variable gasket thickness. Install precombustion chamber as shown in figure 6-30.

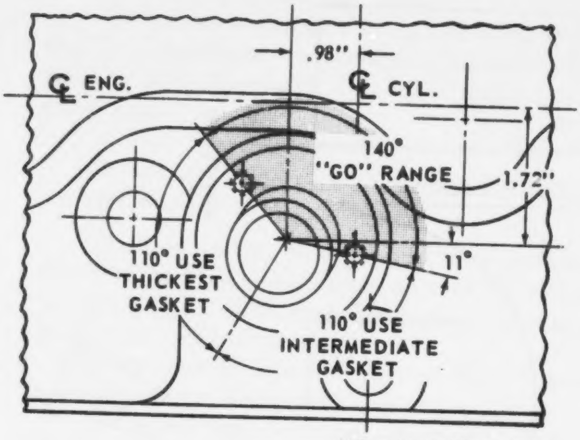

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Figure 6-30. Precombustion chamber positioning.

(5) Install glow plugs (para 3-119).

(6) Connect wiring to water temperature safety switch and glow plugs.

(7) Install water temperature sensing blub (fig. 3-34).

(8) Install cold weather starting aid atomizer (fig. 3-32).

(9) Install fuel injection lines and valves (para 3-100 and para 3-94).

(10) Install cooling system hoses and tube assembly (para 3-71). Refill engine cooling system.

(11) Install turbocharger assembly and manifold (para 3-115 and 3-118).

(12) Check engine oil level and add oil as required. Refer to Lubrication Order (LO) 5-4310-338-12.

(13) Final valve clearance must be made with valve mechanism components heated to operating temperature. Refer to paragraph 2-9 and start engine. Allow engine to reach operating temperature, then stop engine (fig. 2-9).

(14) Retighten cylinder head capscrews as required (table 5-4).

(15) Make final valve clearance adjustment (para 3-117).

NOTE

Final valve clearance must be made within 20 minutes after the warmed up engine has been shut down.

(16) Install valve cover (para 3-116).

(17) Install housing roof and front doors (para -33).

Section XIII. OIL PAN AND OIL PUMP ASSEMBLY

6-28. General

The oil pan is fastened to the bottom of the engine and is the reservoir for the engine lubricating oil supply. The oil pump is mounted on the bottom face of the cylinder block at the front of the engine. The pump is a two-section, positive displacement, gear-type pump. One section scavenges oil from the rear of the engine and dumps it into the oil pan sump. The other section supplies lubrication, under pressure, to the basic engine through passages in the cylinder block, and to external components through oil lines. The pump is driven from the timing gear chain.

6-29. Oil Pan and Plate Assembly

a. Removal.

(1) Drain all oil from oil pan.

(2) Remove instrument panel assembly (para 3-45).

(3) Remove oil pan, plate, and tubing by following numerical sequence shown in figure 6-31.

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard gaskets and O-rings.

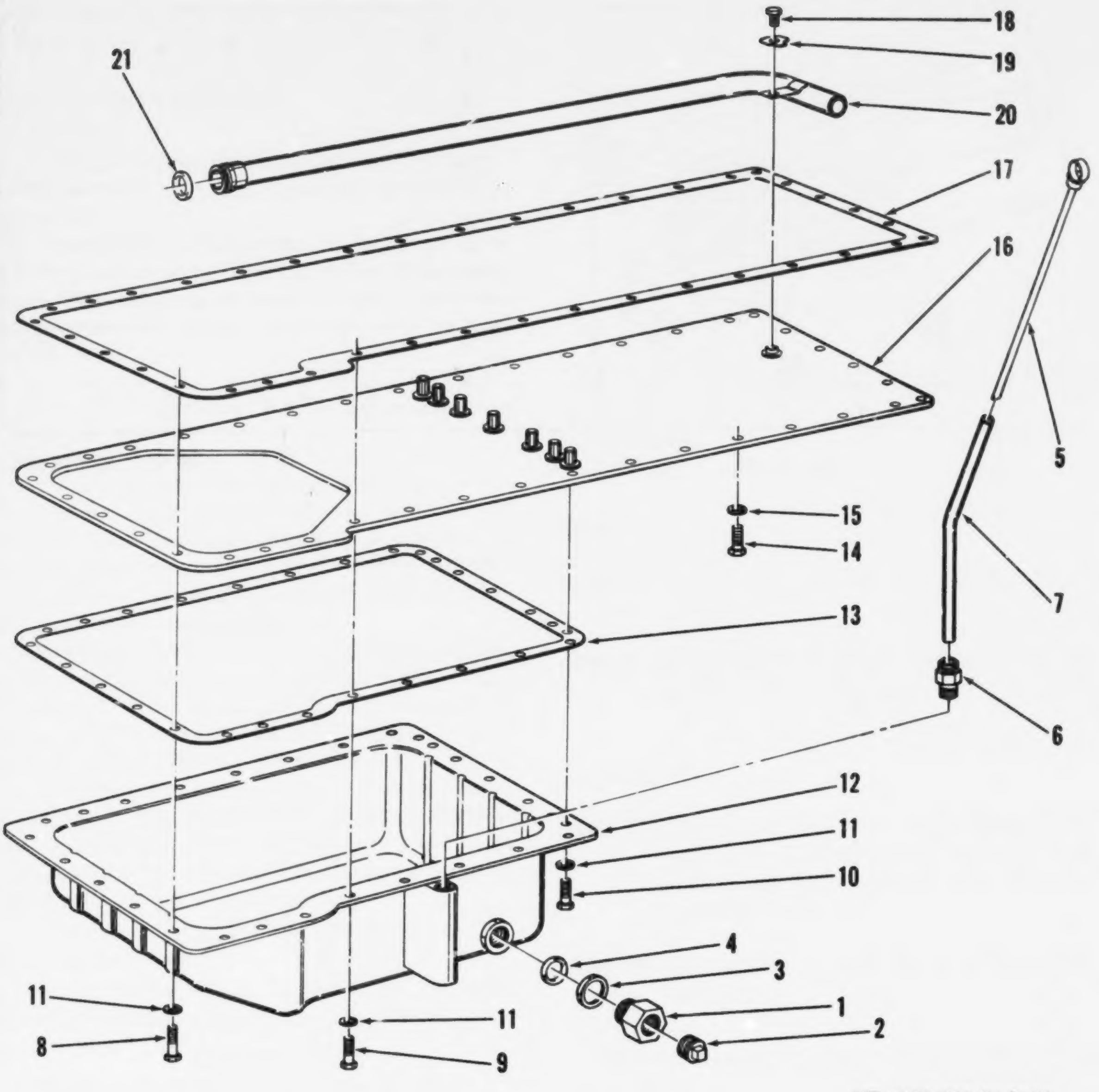
(2) Inspect oil pan and plate for cracks, distortion, damaged flanges, or any other defect.

(3) Inspect tubing for cracks, breaks, distortion, or any other defect.

(4) Inspect attaching hardware for damaged threads, cracks, breaks, distortion, or any other defect.

c. Installtion.

(1) Install oil pan, plate, and tubing by following reverse numerical sequence shown in figure 6-31, except do not attach capscrews that secure instrument panel. Install new gaskets and O-rings. See figure 6-32 for capscrew location chart.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1. Drain plug
2. Plug
3. Gasket
4. O-Ring
5. Gage
6. Fitting
7. Tube
8. Screw
9. Screw (13)
10. Screw (8)
11. Lockwasher (28)
12. Oil pan
13. Gasket
14. Screw (14)
15. Lockwasher (14)
16. Plate
17. Gasket
18. Screw
19. Lock
20. Tube, scavenge
21. O-Ring

Figure 6-31. Oil pan, plate, and tubing; removal and installation.

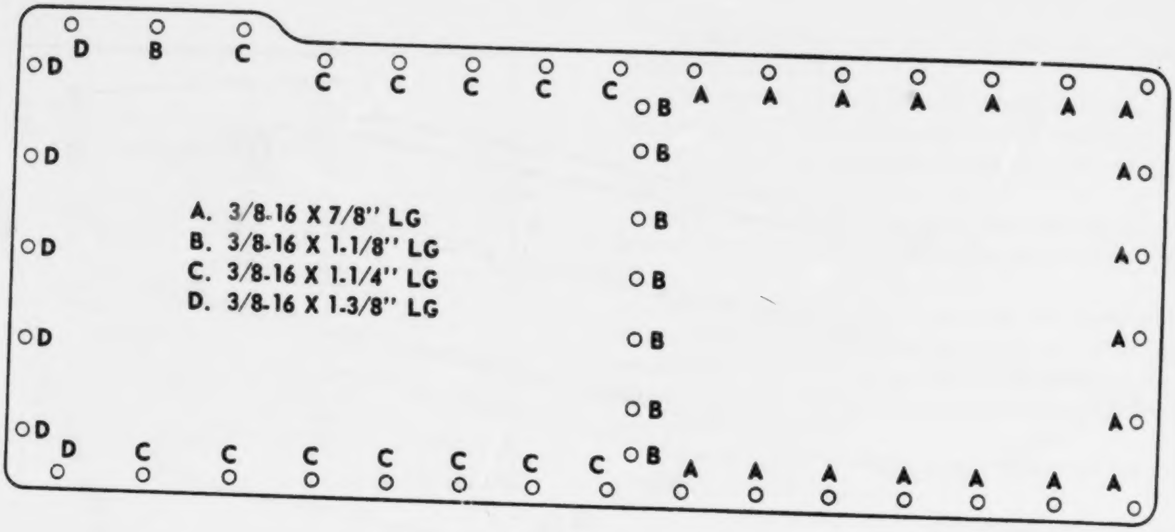

A. 3/8-16 X 7/8" LG
B. 3/8-16 X 1.1/8" LG
C. 3/8-16 X 1.1/4" LG
D. 3/8-16 X 1.3/8" LG
A
B
C
D
ME 4310-338-15/6-32

Figure 6-32. Oil pan and plate capscrew location chart.

(2) Install instrument panel assembly (para 3-45).

(3) Replenish engine lubricating oil supply. Refer to Lubrication Order (LO) 5-4310-338-12 (fig. 3-1).

6-30. Oil Pump Assembly

a. Removal.

(1) Remove engine oil pan and plate (para 6-29).

(2) Remove oil pump assembly as shown in figure 6-33.

b. Disassembly. Disassemble oil pump group in numerical sequence shown in figure 6-34. Before completely disassembling oil pump, measure clearance between gears and covers. Clearance should be 0.002 to 0.004 inches.

NOTE

Do not remove internal gears from shafts unless gears or shafts are being replaced.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard all gaskets and scavenge tube O-ring.

(2) Inspect all gears for cracks, broken teeth, distortion, or any other defect.

(3) Inspect shafts for knicks, cracks, distortion, or any other defect. Measure diameter of each shaft. Diameter of drive shaft and idler gear should be 0.8745 to 0.8749 inches. Diameter of drive idler gear shaft should be 1.1220 to 1.1230 inches.

(4) Inspect bearings for cracks, scoring, excessive wear, or any other defect. Measure shaft-to-bearing clearances. Clearance for idler gear shafts should be 0.008 inches maximum. Clearance for drive shaft should be 0.005 inches maximum.

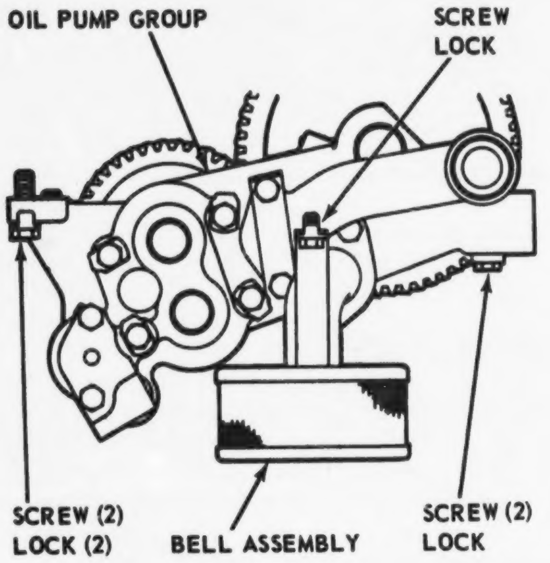
(5) Inspect all other parts for cracks, breaks, distortion, excessive wear, or any other defect.

(6) Inspect attaching hardware for damaged threads, cracks, distortion, or any other defect.

CAUTION

Maximum heating temperature for gears is 750 F.

d. Reassembly. Reassemble oil pump assembly in reverse numerical sequence shown in figure 6-34. Heat gears for installation. Install new gaskets.



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REMOVAL

STEP 1. REMOVE SCREW AND LOCK FROM BELL ASSEMBLY.

STEP 2. REMOVE REMAINING SCREWS AND LOCKS. REMOVE OIL PUMP.

INSTALLATION

STEP 1. PLACE OIL PUMP IN MOUNTING POSITION AND SECURE WITH SCREWS AND LOCKS. BE SURE GEARS ARE SEATED PROPERLY.

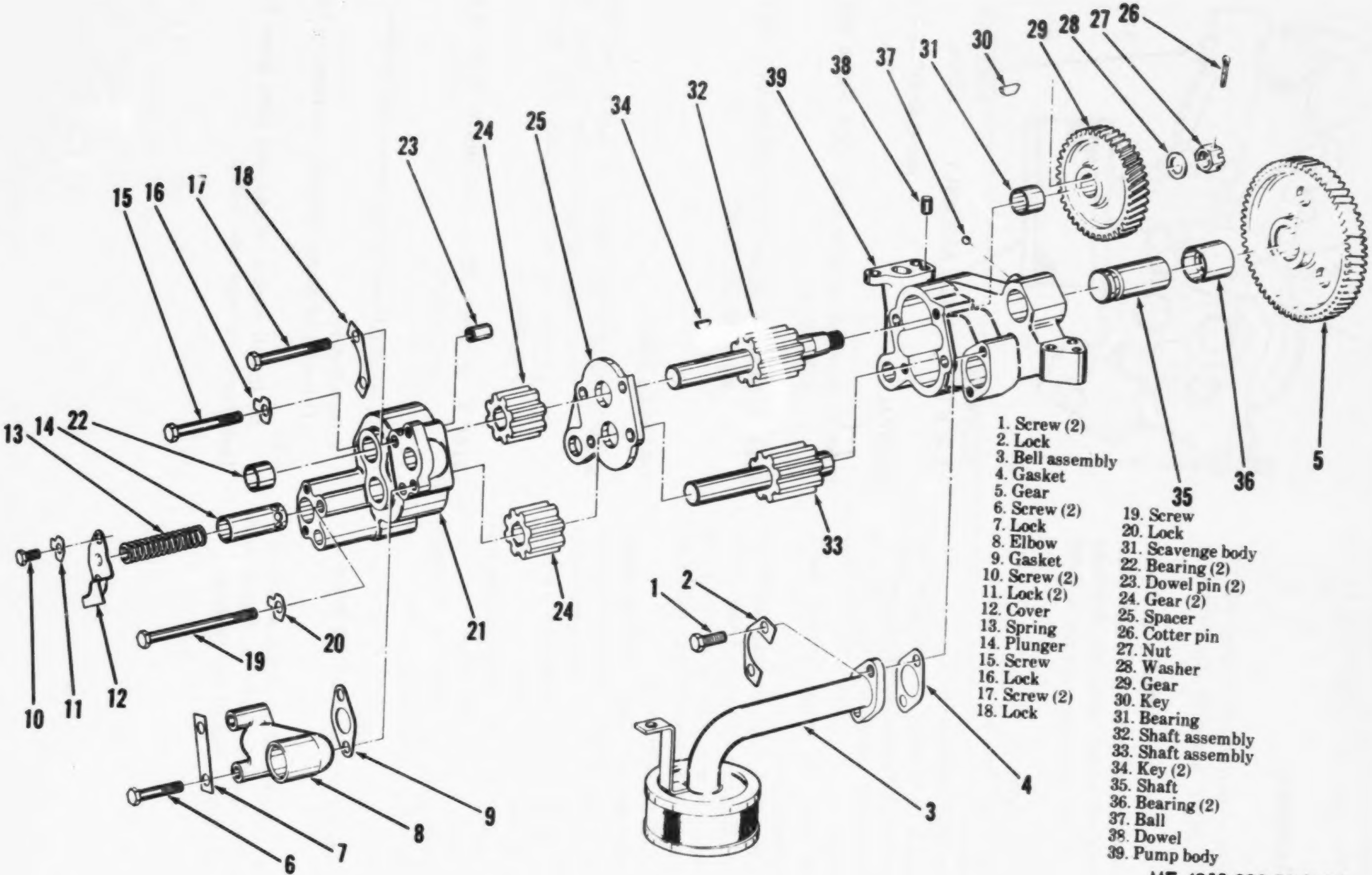
STEP 2. SECURE BELL ASSEMBLY WITH SCREW AND LOCK.

Figure 6-33. Oil pump assembly; removal and installation.

e. Installation.

(1) Install oil pump assembly as shown in figure 6-33.

(2) Install engine oil pan and plate (para 6-29). Install new scavenge tube O-ring.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1. Screw (2)
2. Lock
3. Bell assembly
4. Gasket
5. Gear
6. Screw (2)
7. Lock
8. Elbow
9. Gasket
10. Screw (2)
11. Lock (2)
12. Cover
13. Spring
14. Plunger
15. Screw
16. Lock
17. Screw (2)
18. Lock
19. Screw
20. Lock
31. Scavenge body
22. Bearing (2)
23. Dowel pin (2)
24. Gear (2)
25. Spacer
26. Cotter pin
27. Nut
28. Washer
29. Gear
30. Key
31. Bearing
32. Shaft assembly
33. Shaft assembly
34. Key (2)
35. Shaft
36. Bearing (2)
37. Ball
38. Dowel
39. Pump body

ME 4310-338-15/6-34

Figure 6-34. Oil pump assembly; disassembly and reassembly.

Section XIV. FLYWHEEL AND FLYWHEEL HOUSING

6-31. General

The engine flywheel is bolted to a flange on the rear of the crankshaft. A ring gear is shrink fitted onto the rim of the flywheel. The purpose of the flywheel is to provide an evenly rotating crankshaft speed and balance. The ring gear provides a place for starting motor engagement when cranking the engine. The compressor coupling pins and bushings are also attached to the flywheel. The flywheel is housed in the flywheel housing which is mounted on the rear end of the cylinder block. The flywheel housing also serves as the engine rear support.

6-32. Flywheel and Flywheel Housing

a. Removal.

(1) Remove engine assembly (para 5-13).

(2) Remove flywheel and flywheel housing as shown in figure 6-35. Discard crankshaft seal.

b. Disassembly. Disassemble flywheel housing in numerical sequence shown in figure 6-36.

NOTE

Do not remove ring gear from flywheel unless either is being replaced.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect ring gear for broken or damaged teeth, cracks, or any other defect.

(3) Inspect flywheel housing for cracks, breaks, damaged mounting holes, or any other defect.

(4) Inspect flywheel for elongated holes, cracks, distortion, or any other defect.

(5) Inspect coupling pins and bushings for wear, bending, or any other defect.

(6) Inspect attaching hardware for cracks, damaged threads, distortion, or any other defect.

d. Reassembly. Reassemble flywheel housing in reverse numerical sequence shown in figure 6-36.

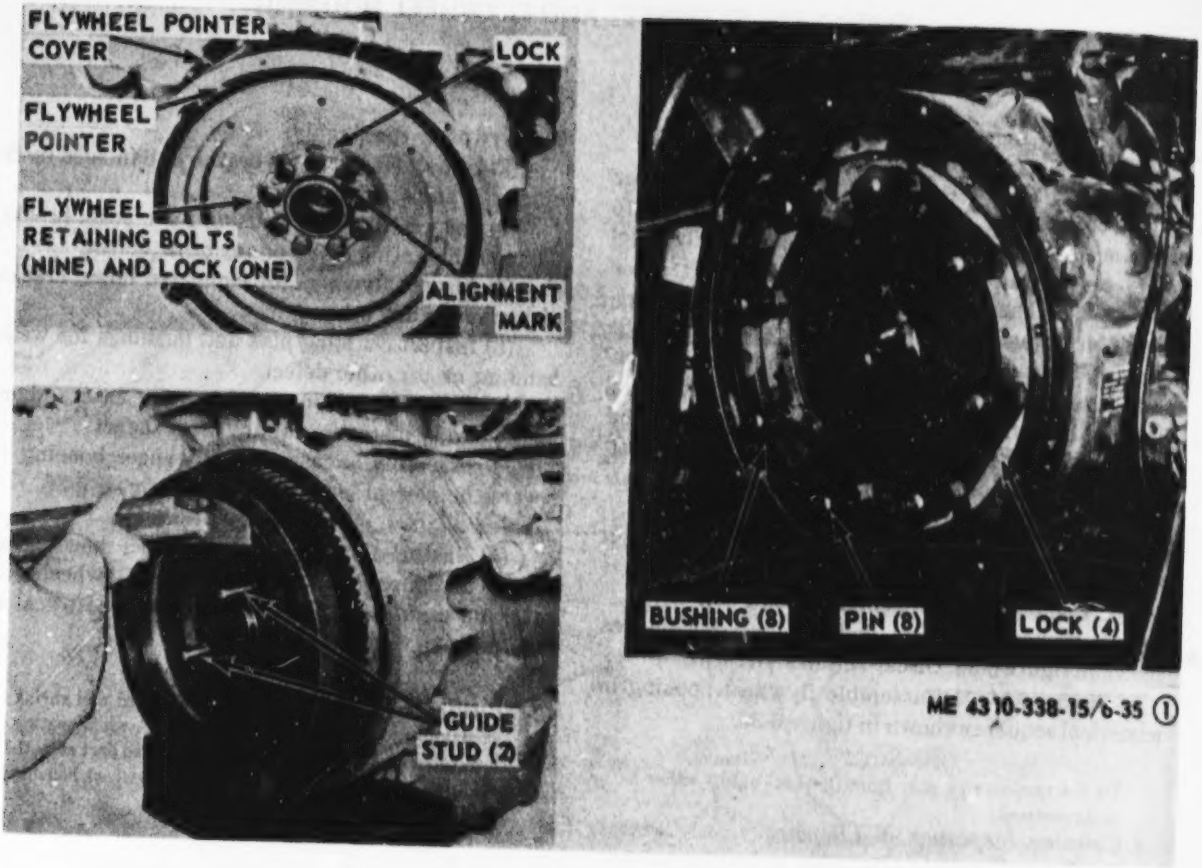
e. Installation.

(1) Install flywheel and flywheel housing as shown in figure 6-35. Align mark on flywheel with mark on crankshaft. Install new crankshaft seal as instructed in view C.

NOTE

If ring gear was removed, it must be heated and shrink fitted onto flywheel. Do not exceed 600° F. when heating ring gear. Install ring gear so that chamfered part of teeth face toward starter pinion opening in flywheel housing when flywheel is installed.

(2) Install engine assembly (para 5-13).


FLYWHEEL POINTER COVER
LOCK
FLYWHEEL POINTER
FLYWHEEL RETAINING BOLTS (NINE) AND LOCK (ONE)
ALIGNMENT MARK
GUIDE STUD (2)
BUSHING (8)
PIN (8)
LOCK (4)

ME 4310-338-15/6-35 ①

REMOVAL

STEP 1. ROTATE FLYWHEEL AND POSITION ALIGNMENT MARK AT TOP CENTER OF FLYWHEEL HOUSING.

STEP 2. REMOVE BUSHINGS, COUPLING PINS, AND LOCKS.

STEP 3. REMOVE TWO FLYWHEEL RETAINING SCREWS AND INSTALL TWO GUIDE STUDS AS SHOWN.

STEP 4. INSTALL LIFTING BRACKET TO FLYWHEEL.

STEP 5. SUPPORT WEIGHT OF FLYWHEEL ON LIFTING BRACKET AND REMOVE REMAINDER OF RETAINING SCREWS AND LOCK. SLIDE FLYWHEEL FROM HOUSING.

INSTALLATION

STEP 1. ATTACH LIFTING BRACKET TO FLYWHEEL AND GUIDE STUDS TO HOUSING. SLIDE FLYWHEEL INTO MOUNTING POSITION.

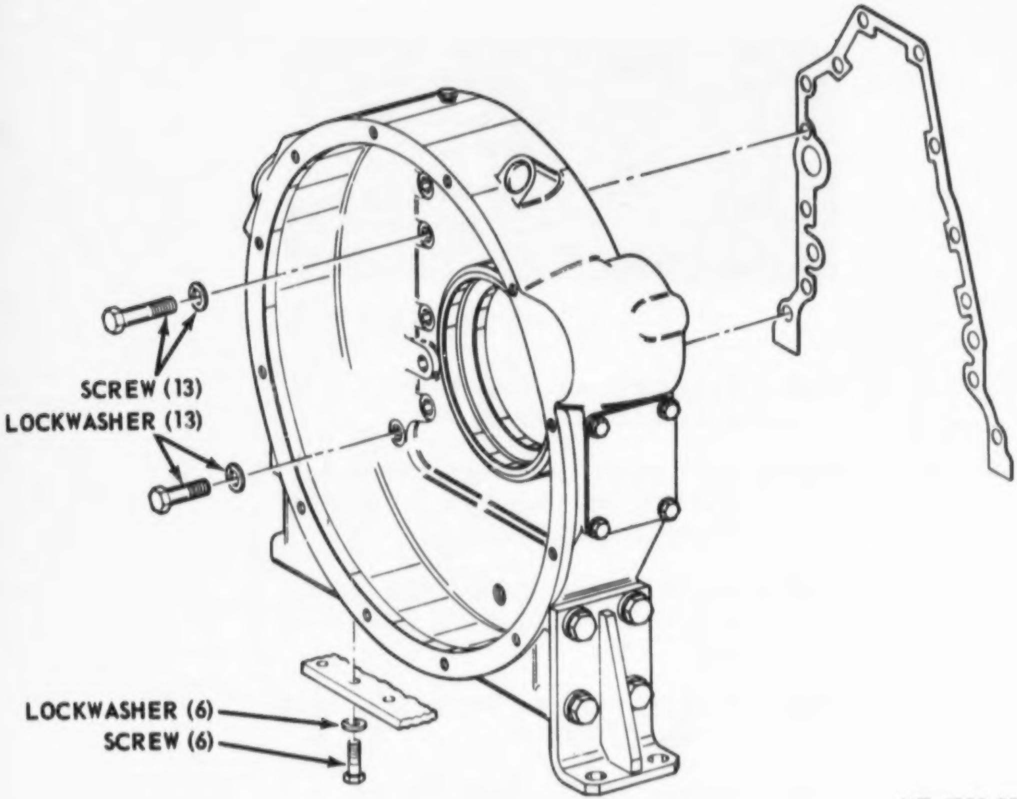
STEP 2. SUPPORT WEIGHT OF FLYWHEEL ON LIFTING BRACKET AND INSTALL LOCK AND RETAINING SCREWS. TIGHTEN SCREWS AND REMOVE LIFTING BRACKET.

STEP 3. REMOVE TWO GUIDE STUDS. INSTALL AND TIGHTEN REMAINDER OF RETAINING SCREWS.

STEP 4. INSTALL PINS, LOCKS, AND BUSHINGS.

A FLYWHEEL

Figure 6-35. Flywheel and flywheel housing, removal and installation (sheet 1 of 3).



ME 4310-338-15/6-35 ②

REMOVAL

STEP 1. REMOVE SIX SCREWS AND LOCKWASHERS WHICH SECURE OIL PAN PLATE AT FLYWHEEL HOUSING. SHIM BETWEEN OIL PAN PLATE AND CYLINDER BLOCK.

STEP 2. CAREFULLY SEPARATE OIL PAN PLATE GASKET FROM FLYWHEEL HOUSING AND INSTALL SHIMS BETWEEN OIL PAN GASKET AND CYLINDER BLOCK.

STEP 3. REMOVE TWO FLYWHEEL HOUSING RETAINING SCREWS AND LOCKWASHERS. INSTALL TWO 1/2-INCH GUIDE STUDS.

STEP 4. REMOVE REST OF RETAINING SCREWS AND LOCKWASHERS. REMOVE FLYWHEEL HOUSING.

INSTALLATION

STEP 1. INSTALL TWO 1/2-INCH GUIDE STUDS IN CYLINDER BLOCK.

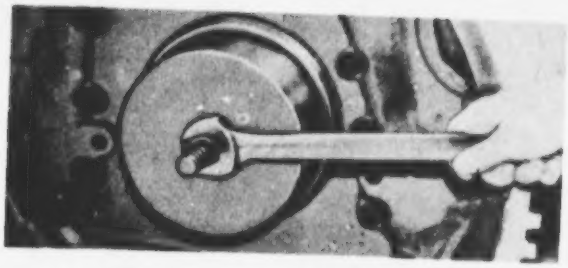
STEP 2 BE SURE SHIMS ARE PROPERLY INSTALLED BETWEEN OIL PAN PLATE, GASKET, AND CYLINDER BLOCK. SLIDE FLYWHEEL HOUSING ONTO GUIDE STUDS AND SEAT AGAINST CYLINDER BLOCK.

STEP 3. INSTALL AND TIGHTEN RETAINING SCREWS AND LOCKWASHERS. REMOVE GUIDE STUDS; INSTALL AND TIGHTEN RETAINING SCREWS AND LOCKWASHERS.

STEP 4. CAREFULLY REMOVE SHIMS AND BE SURE OIL PAN PLATE GASKET SEATS PROPERLY. INSTALL AND TIGHTEN SIX SCREWS AND LOCKWASHERS IN OIL PAN PLATE.

B FLYWHEEL HOUSING

Figure 6-35. Flywheel and flywheel housing, removal and installation (sheet 2 of 3).



ME 4310-338-15/6-35 ③

STEP 1. FABRICATE PILOT AND SLEEVE AS ILLUSTRATED IN FIGURE 5-10.

STEP 2. BOLT PILOT TO CRANKSHAFT FLANGE AND POSITION SEAL ON PILOT WITH LIP FACING CYLINDER BLOCK.

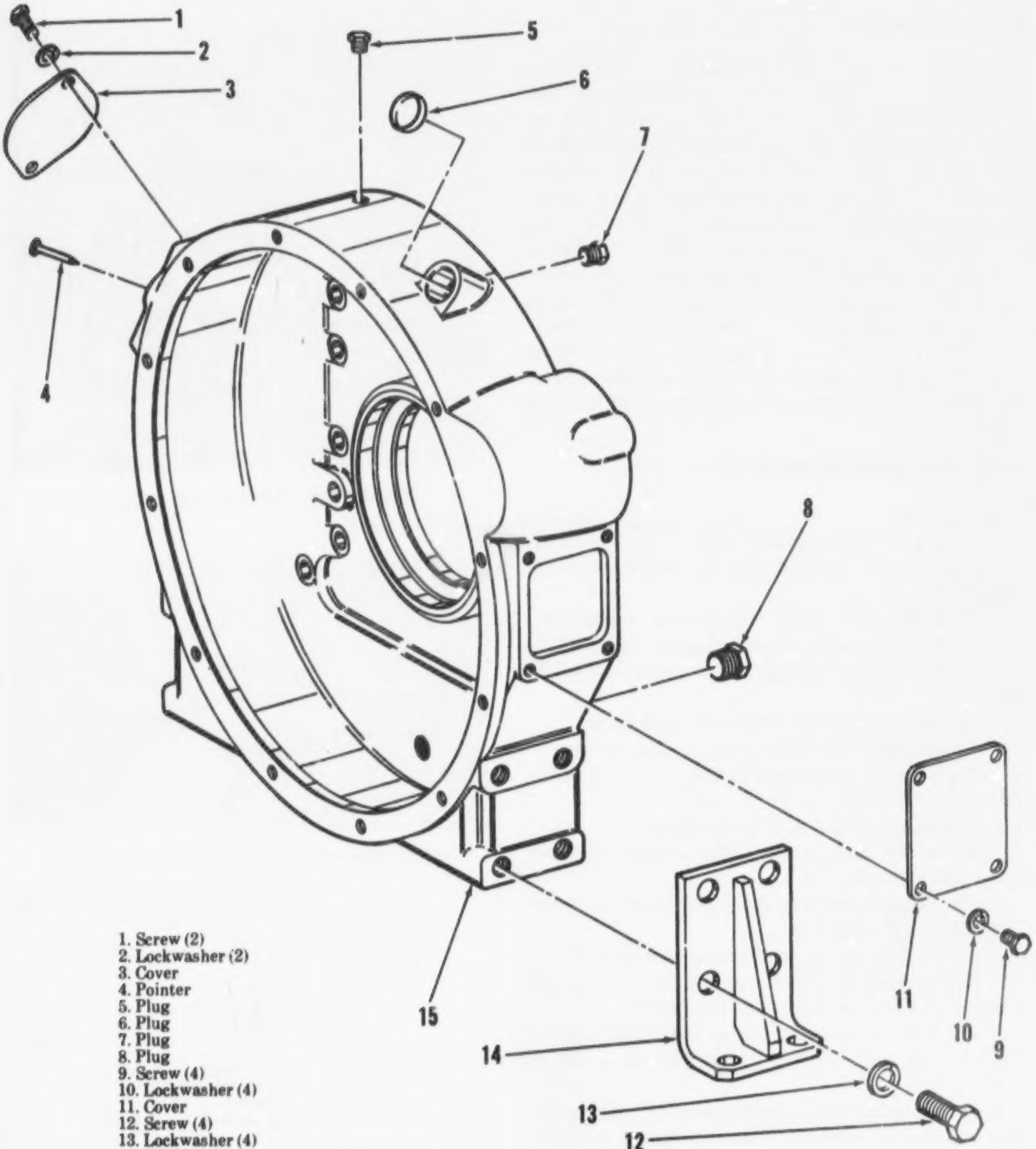
STEP 3. PLACE SLEEVE ON STUD AND INSTALL A 3/4-INCH WASHER AND 3/4''-10 NC NUT.

STEP 4. TIGHTEN NUT TO PRESS SEAL INTO FLYWHEEL HOUSING.

STEP 5. REMOVE INSTALLATION TOOLS.

C INSTALLING CRANKSHAFT SEAL

Figure 6-35. Flywheel and flywheel housing, removal and installation (sheet 3 of 3).



1. Screw (2)
2. Lockwasher (2)
3. Cover
4. Pointer
5. Plug
6. Plug
7. Plug
8. Plug
9. Screw (4)
10. Lockwasher (4)
11. Cover
12. Screw (4)
13. Lockwasher (4)
14. Support
15. Flywheel housing

ME 4310-338-15/6-36

Figure 6-36. Flywheel housing; disassembly and reassembly.

Section XV. ACCESSORY DRIVE SHAFT ASSEMBLY

6-33. General

The accessory drive shaft drives the governor, fuel injection pump camshaft, service meter, and fuel transfer pump. The accessory drive shaft, enclosed in an adaptor housing, is supported by a bearing at the front and by a sleeve on the fuel injection pump camshaft at the rear. The adapter housing is bolted to the timing gear housing plate at the front. The fuel injection pump housing is bolted to the rear of the adaptor housing. The fuel transfer pump is driven by a gear machined on the accessory drive shaft; the service meter is driven by the fuel transfer pump. Coupled to the rear of the accessory drive shaft is the fuel injection pump camshaft and fastened to the rear of the camshaft is the governor rotating shaft.

6-3 . Accessory Drive Shaft

a. Removal.

(1) Remove towbar (para 3-132).

(2) Remove radiator and oil cooler assembly (para 3-73).

(3) Remove side doors and housing components, as necessary, to provide access to engine (para 3-33).

(4) Remove fan assembly and pulley (para 3-74 and 3-77).

(5) Remove generator assembly (para 3-102).

(6) Remove water pump assembly (para 3-76).

(7) Remove crankshaft pulley and vibration damper (para 6-36).

(8) Remove timing gear cover (para 6-37).

(9) Remove fuel transfer pump and service meter (para 3-95 and 3-56).

(10) Remove primary fuel filter (para 3-97) and final fuel filter (para 3-98).

(11) Remove fuel pump starting tank (para 3-99).

(12) Remove governor and fuel injection pump housing as a unit (para 6-17 and para 6-20).

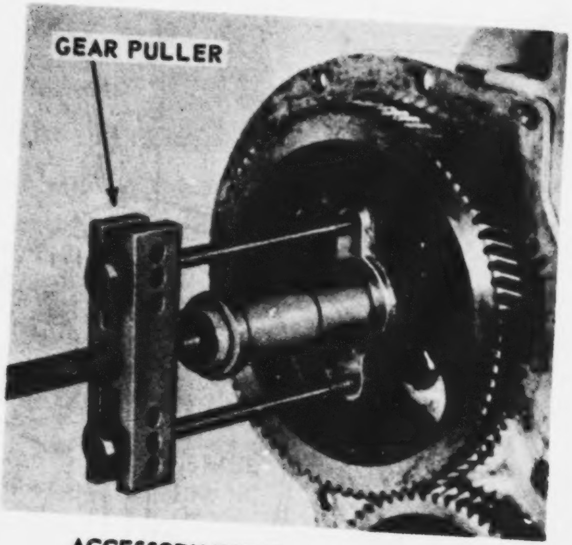
(13) Remove accessory drive shaft and housing by following numerical sequence shown in figure 6-37.

b. Disassembly. Disassemble accessory drive shaft and housing in numerical sequence shown in figure 6-38. Discard gaskets.

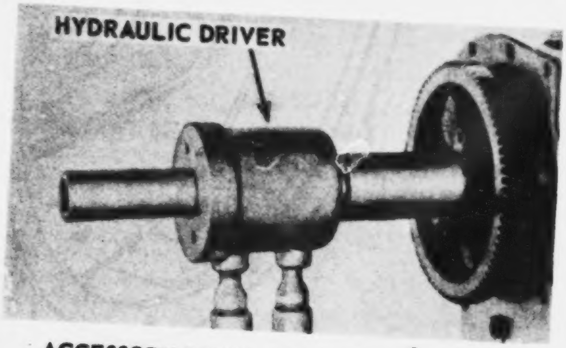
c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect bearing for grittiness, freedom of movement, cracks, or any other defect.



ACCESSORY DRIVE GEAR REMOVAL



ACCESSORY DRIVE GEAR INSTALLATION

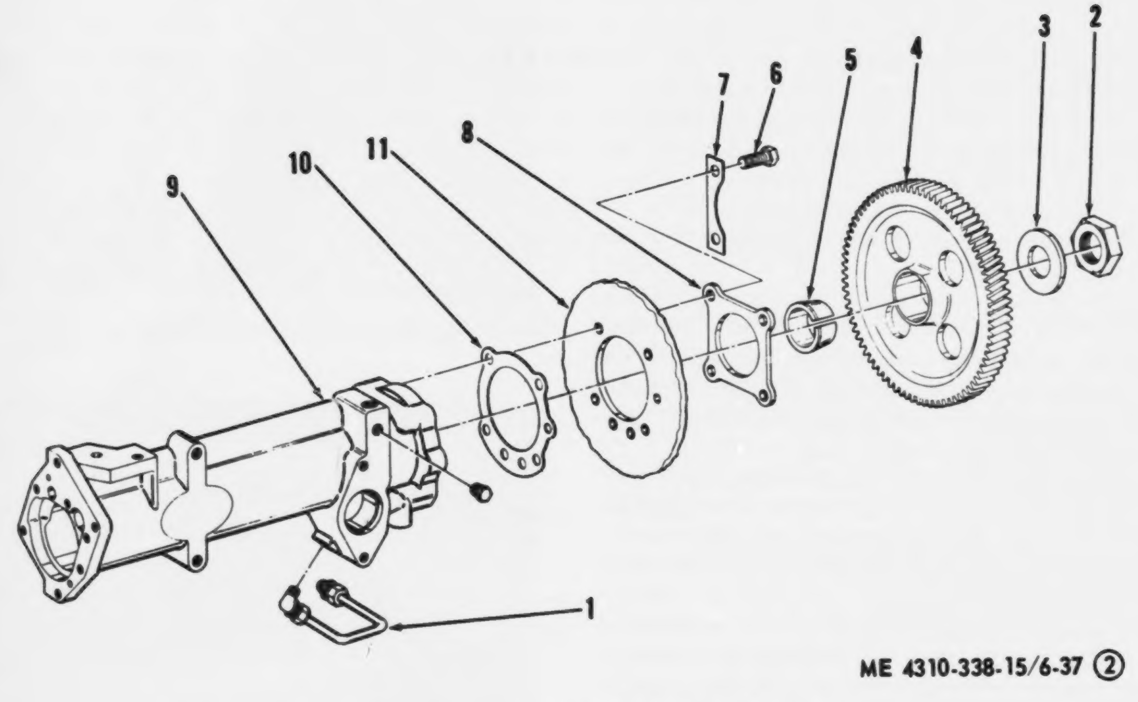
ME 4310-338-15/6-37 ①

1. Tube assembly
2. Nut
3. Washer
4. Gear
5. Sleeve
6. Screw (4)
7. Lock (2)
8. Retainer
9. Housing assembly
10. Gasket
11. Plate (ref)

Figure 6-37. Accessory drive shaft and housing, removal and installation (sheet 1 of 2).

(3) Inspect drive shaft for excessive wear, cracks, damaged or chipped teeth, distortion, or any other defect.

(4) Inspect housing for cracks, breaks, distortion, or any other defect.



3
2
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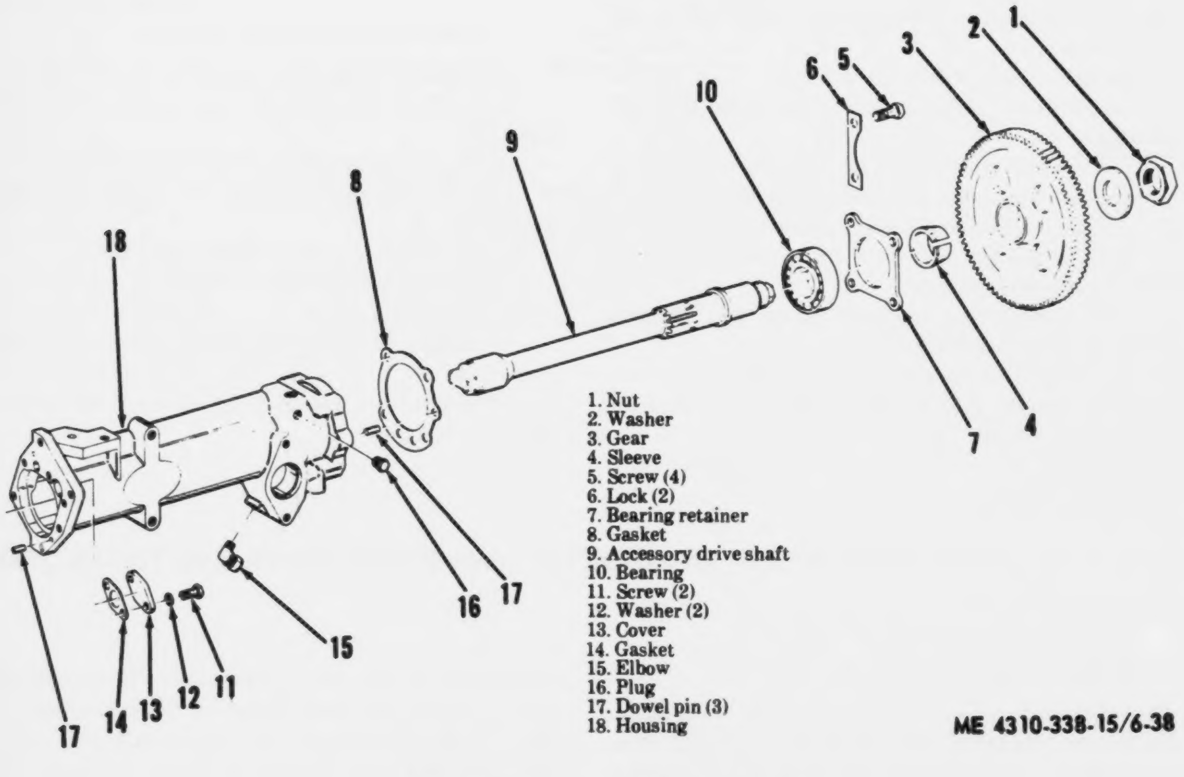
ME 4310-338-15/6-37 ②

Figure 6-37. Accessory drive shaft and housing, removal and installation (sheet 2 of 2).



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11
ME 4310-338-15/6-38

1. Nut
2. Washer
3. Gear
4. Sleeve
5. Screw (4)
6. Lock (2)
7. Bearing retainer
8. Gasket
9. Accessory drive shaft
10. Bearing
11. Screw (2)
12. Washer (2)
13. Cover
14. Gasket
15. Elbow
16. Plug
17. Dowel pin (3)
18. Housing

Figure 6-38. Accessory drive shaft and housing; disassembly and reassembly.

d. Reassembly. Reassemble accessory drive shaft and housing in reverse numerical sequence shown in figure 6-38. Install new gaskets.

e. Installation.

(1) Install accessory drive shaft and housing by following reverse numerical sequence shown in figure 6-37. Do not install gear at this time.

(2) Remove valve cover (para 3-116).

(3) Remove timing pointer cover from flywheel housing (fig. 3-103).

(4) Rotate crankshaft counterclockwise (as viewed from flywheel end) at least 60°. Continue rotating crankshaft counterclockwise until TC1-6 CYL mark on flywheel is aligned with timing pointer and both the inlet and exhaust valves of cylinder No. 1 are closed.

(5) Install timing plate on rear face of accessory drive housing as shown in figure 6-39. If timing plate can be installed, timing is correct; proceed to step 7. If timing plate cannot be installed, proceed to step 6 and adjust timing.

(6) Turn accessory drive shaft, using extension nut, until timing plate fits properly on accessory drive housing. When the plate fits, the drive shaft is properly timed.

(7) Remove timing plate. Install accessory drive gear as shown in figure 6-41. Align timing marks as shown in figure 6-42. Tighten retaining nut to 100 ± 10 foot-pounds.

(8) Install valve cover (para 3-116).

(9) Install timing pointer cover on flywheel housing.

(10) Install governor and fuel injection pump housing as a unit (para 6-17 and para 6-20).

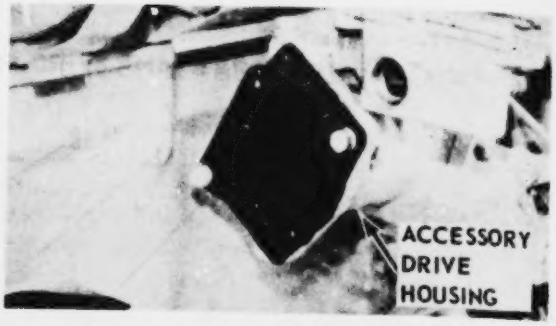
(11) Install fuel pump starting tank (para 3-99).

(12) Install primary fuel filter (para 3-97) and final fuel filter (para 3-98).

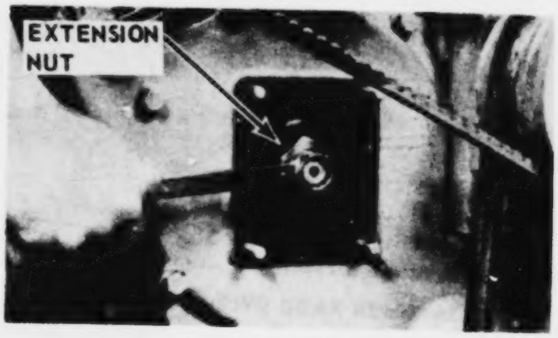
(13) Install fuel transfer pump and services meter (para 3-95 and 3-56).

(14) Install timing gear cover (para 6-37).

(15) Install crankshaft pulley and vibration damper (para 6-36).



TIMING FIXTURE PLATE INSTALLED



ROTATING THE ACCESSORY DRIVE SHAFT

ME 4310-338-15/6-39

Figure 6-39. Accessory drive shaft timing.

(16) Install water pump assembly (para 3-76).

(17) Install fan assembly and pulley (para 3-74 and 3-77).

(18) Install generator assembly (para 3-102).

(19) Install radiator and oil cooler assembly (para 3-73).

(20) Install housing components (para 3-33).

(21) Install tow bar (para 3-132).

f. Adjustments.

(1) Adjust fuel injection pump timing dimension (para 6-20).

(2) Adjust fuel rack setting on governor assembly (para 6-17).

Section XVI. CRANKSHAFT PULLEY AND DAMPER, TIMING GEAR COVER, AND TIMING GEARS

6-35. General

The crankshaft pulley is installed on the front end of the engine crankshaft and, by means of V-type drive belts, drives the generator and cooling fan pulleys. The timing gear train consists of five gears located at the front of the engine; the gears are protected and sealed by the timing gear cover. The crankshaft gear is keyed and press fitted on the crankshaft. As the crankshaft rotates, the crankshaft gear drives the camshaft gear and the oil pump idler gear. The oil pump idler gear drives the oil pump. The camshaft gear drives the water pump and the accessory drive idler gear; the idler gear drives the accessory drive gear. Timing of the gears is accomplished by matching alignment marks on the gears when the No. 1 piston is positioned at top center during the compression stroke. All timing gear bearings, except the accessory drive gear bearing, are pressure lubricated. Oil is supplied to the bearings through passages in the cylinder block. The accessory drive gear bearing is lubricated by oil draining from the accessory drive shaft housing.

6-36. Crankshaft Pulley and Vibration Damper

a. Removal.

(1) Remove radiator and oil cooler assembly (para 3-73).

(2) Remove drive belts (para 3-72).

(3) Remove crankshaft pulley and vibration damper as shown in figure 6-40.

b. Cleaning and Inspection.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect pulley and damper for cracks, breaks, distortion, or any other defect.

(3) Inspect attaching hardware for cracks, damaged threads, distortion, or any other defect.

c. Installation.

(1) Install crankshaft pulley and vibration damper as shown in figure 6-40.

(2) Install drive belts (para 3-72).

(3) Install radiator and oil cooler assembly (para 3-73).

6-37. Timing Gear Cover and Timing Gears

a. Removal and Disassembly.

(1) Remove engine assembly (para 5-13).

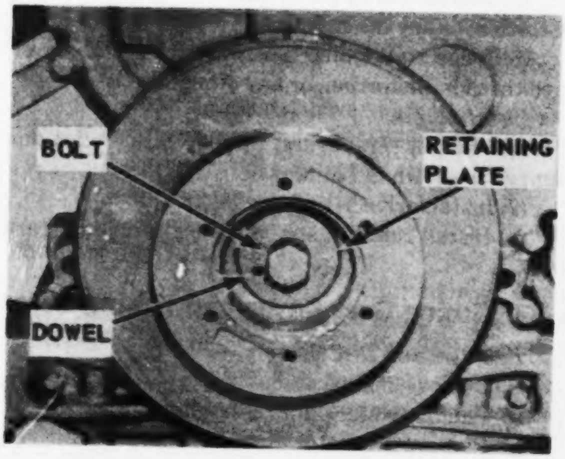
(2) Remove water pump assembly (para 3-76).

(3) Remove generator assembly (para 3-102).

(4) Remove crankshaft pulley and damper assembly (para 6-36).

(5) Remove oil pan (para 6-29).

(6) Remove and disassemble engine timing gear cover by following numerical sequence shown in figure 6-41. Discard gasket and seal. Remove timing gears as shown.


BOLT
RETAINING PLATE
DOWEL

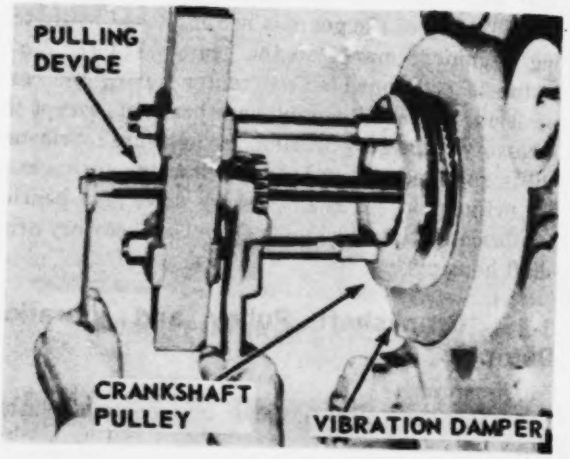
REMOVAL

STEP 1. REMOVE BOLT AND RETAINING PLATE.

STEP 2. USE A PULLING DEVICE AND REMOVE CRANKSHAFT PULLEY AND VIBRATION DAMPER.

STEP 3. REMOVE SCREWS AND LOCKWASHERS AND SEPARATE PULLEY FROM DAMPER.

A


PULLING DEVICE
CRANKSHAFT PULLEY
VIBRATION DAMPER

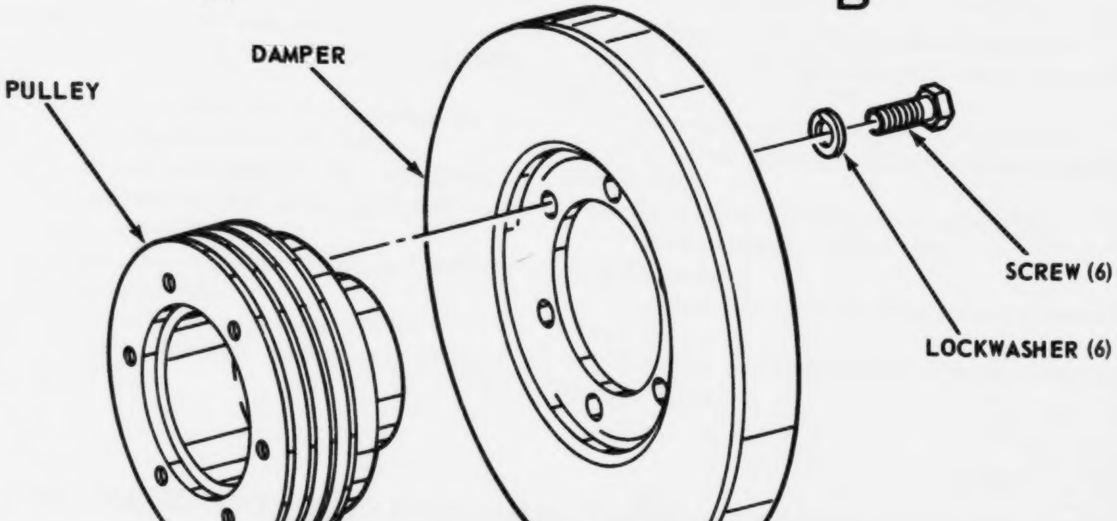
INSTALLATION

STEP 1. SECURE PULLEY TO DAMPER USING SCREWS AND LOCKWASHERS.

STEP 2. PRESS PULLEY AND DAMPER ONTO CRANKSHAFT.

STEP 3. INSTALL RETAINING PLATE. SECURE PULLEY AND DAMPER WITH BOLT.

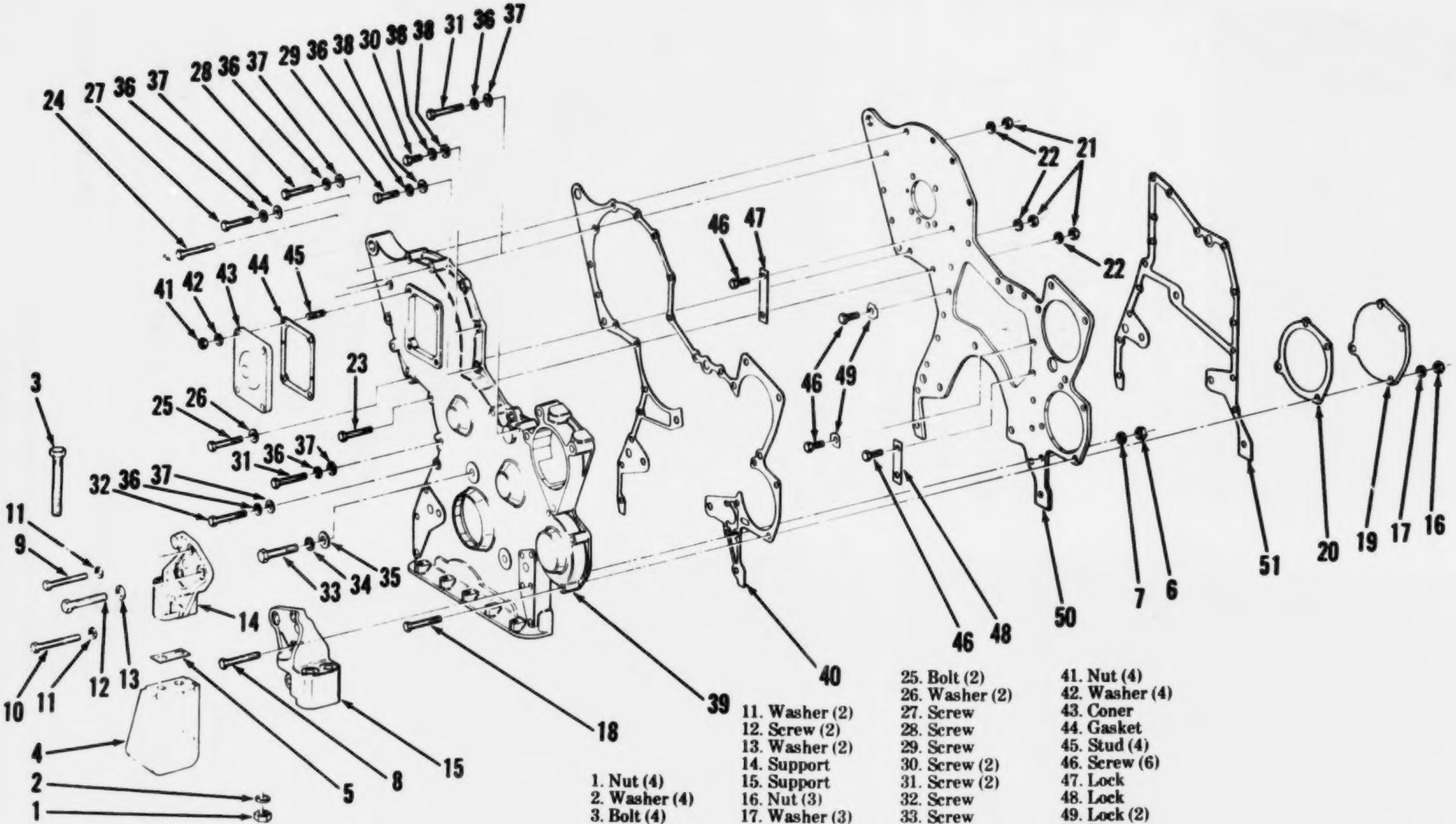
B


DAMPER
PULLEY
SCREW (6)
LOCKWASHER (6)

C

ME 4310-338-15/6-40

Figure 6-40. Crankshaft pulley and vibration damper; removal and installation.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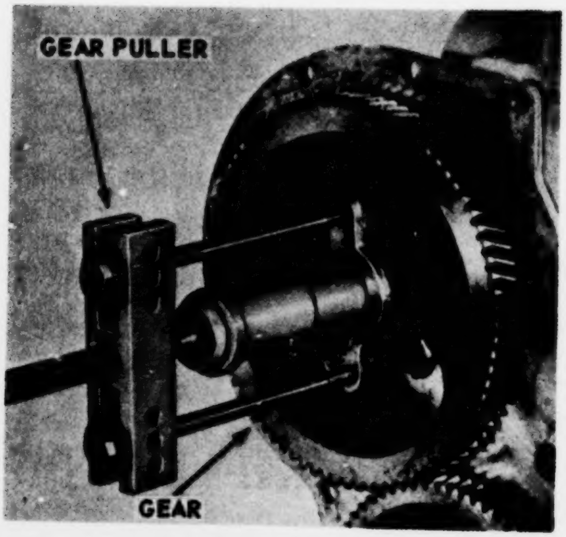
1. Nut (4)
2. Washer (4)
3. Bolt (4)
4. Support (2)
5. Shim (2)
6. Nut
7. Washer
8. Bolt
9. Screw (4)
10. Screw (2)
11. Washer (2)
12. Screw (2)
13. Washer (2)
14. Support
15. Support
16. Nut (3)
17. Washer (3)
18. Bolt (3)
19. Cover
20. Gasket
21. Nut (5)
22. Washer (5)
23. Bolt
24. Bolt (2)
25. Bolt (2)
26. Washer (2)
27. Screw
28. Screw
29. Screw
30. Screw (2)
31. Screw (2)
32. Screw
33. Screw
34. Washer
35. Washer
36. Washer (9)
37. Washer (6)
38. Washer (3)
39. Cover
40. Gasket
41. Nut (4)
42. Washer (4)
43. Coner
44. Gasket
45. Stud (4)
46. Screw (6)
47. Lock
48. Lock
49. Lock (2)
50. Plate
51. Gasket

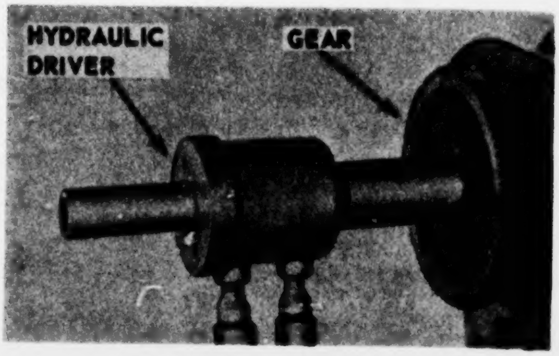
ME 4310-338-15/6-41 ①

A TIMING GEAR COVER GROUP

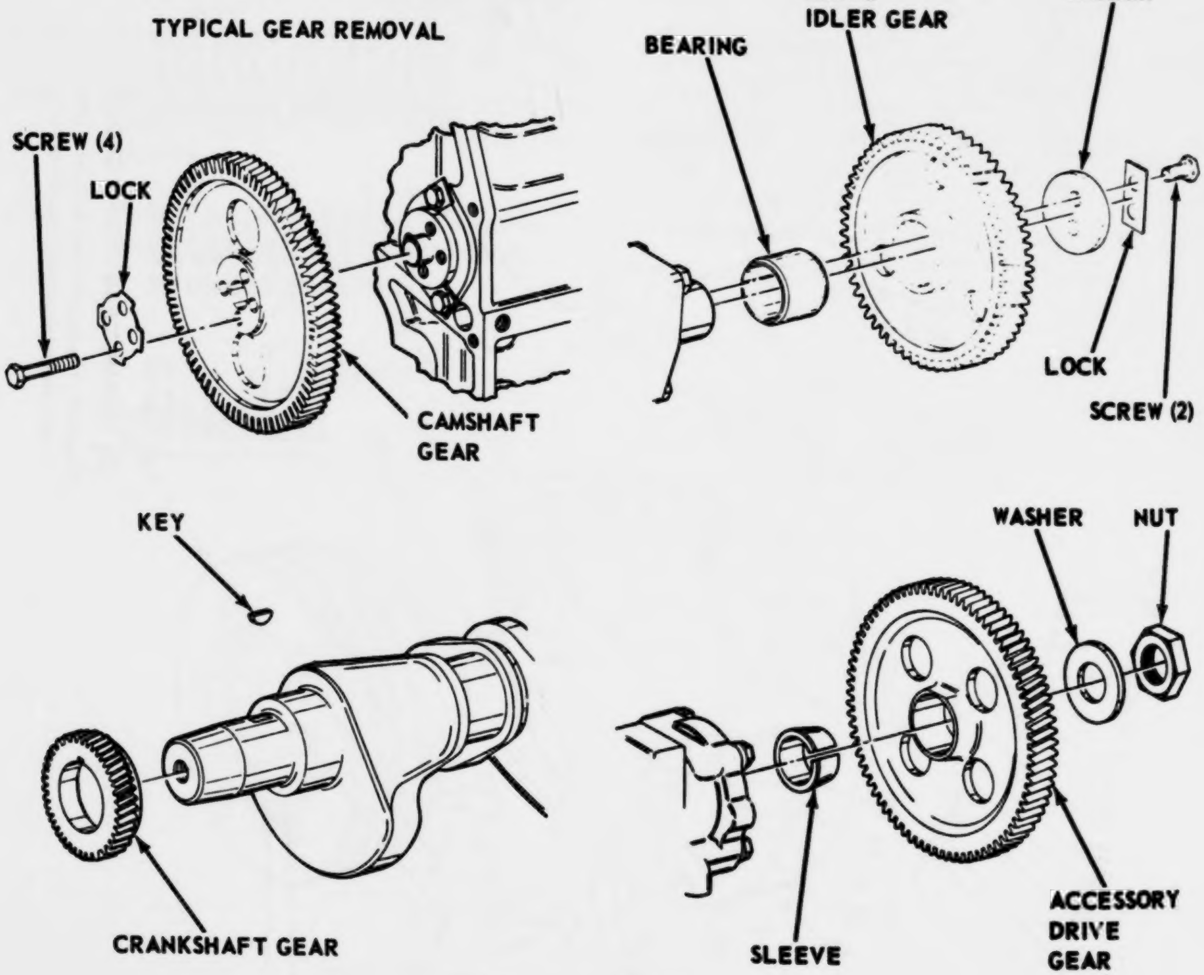
Figure 6-41. Timing gear cover and timing gears; removal and installation (sheet 1 of 2).


GEAR PULLER
GEAR

TYPICAL GEAR REMOVAL


HYDRAULIC DRIVER
GEAR

TYPICAL GEAR INSTALLATION


ACCESSORY DRIVE IDLER GEAR
WASHER
BEARING
SCREW (4)
LOCK
CAMSHAFT GEAR
LOCK
SCREW (2)
KEY
WASHER
NUT
CRANKSHAFT GEAR
SLEEVE
ACCESSORY DRIVE GEAR

B TIMING GEARS

ME 4310-338-15/6-41 ②

Figure 6-41. Timing gear cover and timing gears, removal and installation (sheet 2 of 2).

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard all gaskets.

(2) Inspect timing gear cover parts for cracks, breaks, distortion, or any other defect. Replace as necessary.

(3) Inspect timing gears for cracks, broken or chipped teeth, distortion, or any other defect. Replace as necessary.

(4) Measure diameter of bearing bore in accessory drive idler gear. Diameter should be 1.376 to 1.381 inches.

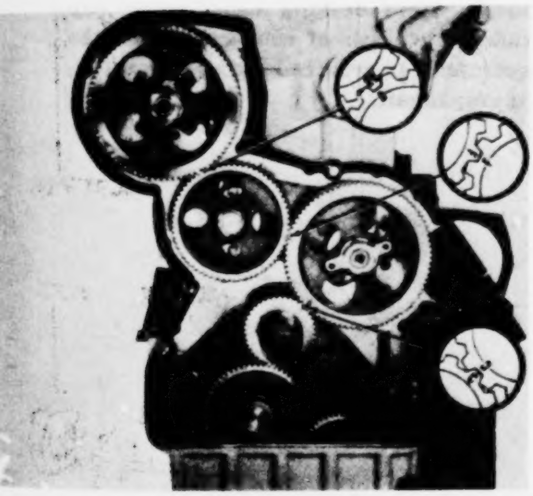
(5) Inspect attaching hardware for damaged threads, cracks, distortion, or any other defect.

d. Reassembly and Installation.

(1) Reassemble and install engine timing gear cover by following reverse numerical sequence shown in figure 6-41. Install new seal and gaskets. Install engine timing gears as shown.

(a) Position cylinder No. 1 piston at top center (para 3-117, steps *a.* through *c.*).

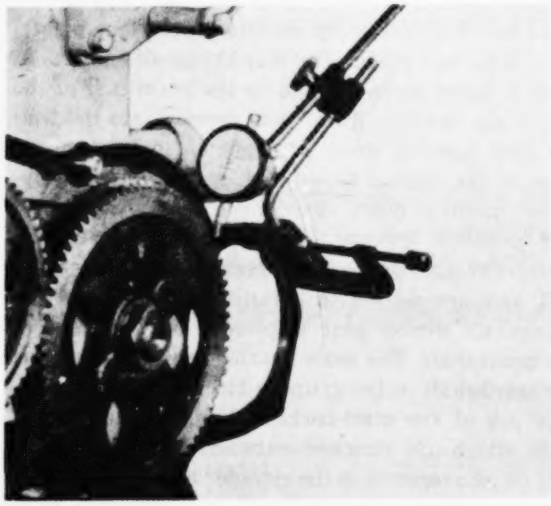
(b) Align gear timing marks as shown in figure 6-42.



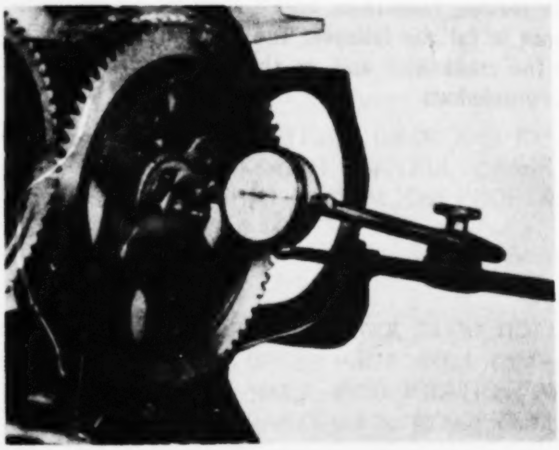
ME 4310-338-15/6-42

Figure 6-42. Timing gear alignment.

(c) Measure backlash between accessory drive idler gear and camshaft gear, and between camshaft gear and crankshaft gear. See figure 6-43. Correct measurements are listed in table 5-1. If dial reading is greater than that allowed, either the timing gears, main bearings, or camshaft bearings are badly worn. Timing gear wear can be compensated for by adjusting fuel injection timing. Worn main bearings or camshaft bearings must be replaced. If dial indicator reading is less than 0.001 inches, it is an indication of incorrect installation or a burr or rough spot on one of the gears. In this case, take readings every 90° around gear to determine the cause. Correct problem by removing burr or reinstalling gear. Repeat backlash measurement.



A CHECKING GEAR BACKLASH



B CHECKING END CLEARANCE

ME 4310-338-15/6-43

Figure 6-43. Typical timing gear backlash and end clearance checks.

(d) Measure accessory drive idler gear and clearance and camshaft gear end clearance. See figure 6-43. Correct clearances are listed in Table 5-1.

(e) Install washer on accessory drive gear with concave side toward gear.

(2) Install oil pan (para 6-29).

(3) Install crankshaft pulley and damper assembly (para 6-36).

(4) Install generator assembly (para 3-102).

(5) Install water pump assembly (para 3-76).

(6) Install engine assembly (para 5-13).

Section XVII. CRANKSHAFT AND MAIN BEARINGS

6-38. General

The crankshaft assembly consists of the crankshaft, gear, key, and plugs. The end thrust of the crankshaft is taken up by flanges on the lower half of the rear main bearing. An oil seal pressed into the timing gear housing cover prevents oil leakage at the front of the engine. An oil seal, pressed into the flywheel housing, bears against the crankshaft flange and prevents leakage at the rear of the engine. Counterweights are forged integrally with the cranksaft and are drilled to obtain shaft balance. The crankshaft timing gear is pressed on the front of the crankshaft. The main bearings and caps support the crankshaft in the cylinder block. The main bearings are of the steel-backed aluminum-lined type. Tabs which are punched outward on each bearing half fit into recesses in the cylinder block and bearing cap, securing the bearing and preventing it from rotating. This provides an uninterrupted bearing ssrface in the most highly-loaded area, improving the loading conditions and giving maximum resistance to fatigue failures. The pistons are connected to the crankshaft and, as the cylinders fire, rotate the crankshaft.

6-39. Crankshaft and Main Bearings

a. *Removal.*

(1) Remove engine assembly (para 5-13).

(2) Remove water pump assembly (para 3-76).

(3) Remove timing gear cover (para 6-37).

(4) Remove oil pan and plate (para 6-29).

(5) Remove flywheel and flywheel housing (para 6-32).

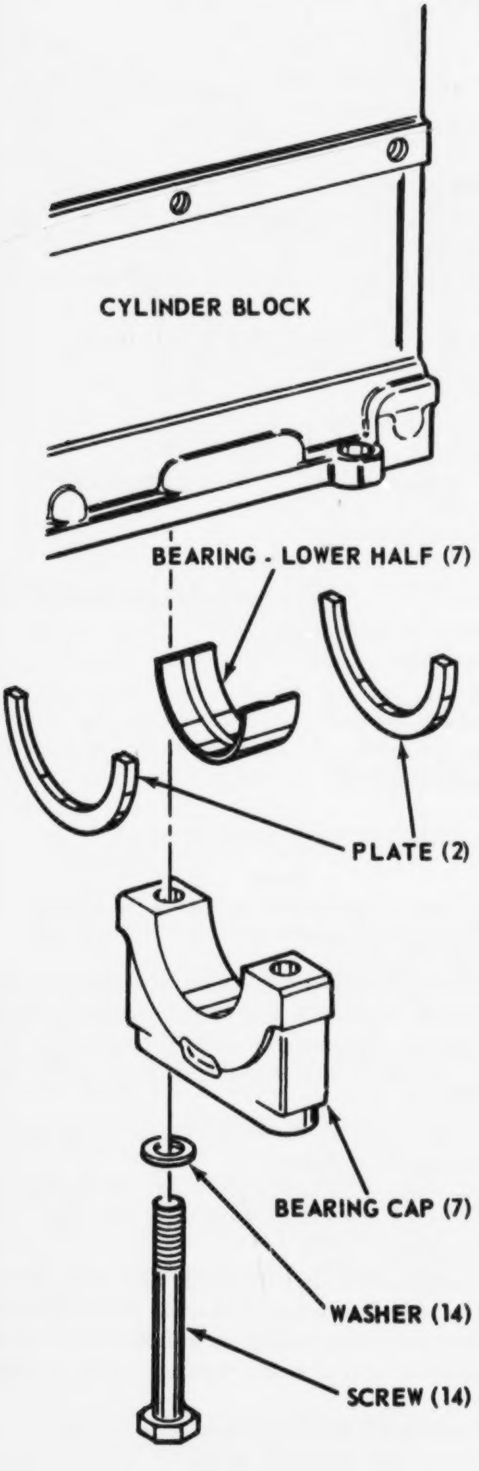
(6) Remove oil pump assembly (para 6-30).

(7) Fabricate a bearing removal tool as shown in figure 5-8.

(8) Remove main bearings and crankshaft assembly as shown in figure 6-44.

CAUTION

To protect bearing surfaces from galling, wrap each surface with a clean heavy cloth before attaching cables. When removing main bearing caps, cover cap studs with pieces of rubber hose (or the equivalent) to prevent nicking or scratching crankshaft.



REMOVAL

STEP 1. REMOVE SCREWS AND WASHERS FROM BEARING CAPS. REMOVE BEARING CAPS AND BEARING LOWER HALVES. REMOVE PLATES (REAR BEARING ONLY).

STEP 2. PLACE FABRICATED TOOL (FIGURE 5-8) IN OIL HOLE (VIEW B). ROLL BEARING UPPER HALF OUT BY ROTATING CRANKSHAFT. ROLL BEARING HALF OUT TAB END FIRST. REPEAT FOR EACH UPPER HALF.

STEP 3. REMOVE CRANKSHAFT. REMOVE GEAR AND KEY (VIEW C).

INSTALLATION

STEP 1. HEAT GEAR. INSTALL GEAR AND KEY ONTO CRANKSHAFT. INSTALL CRANKSHAFT SO THAT GEAR ALIGNS PROPERLY (FIGURE 6-44).

STEP 2. PLACE FABRICATED TOOL IN OIL HOLE OF BEARING UPPER HALF. ROLL BEARING UPPER HALF INTO POSITION BY ROTATING CRANKSHAFT. BE CERTAIN TAB IS ALIGNED WITH RECESS IN CYLINDER BLOCK. REMOVE TOOL AND REPEAT STEP FOR EACH UPPER HALF.

STEP 3. PLACE BEARING LOWER HALVES IN MOUNTING POSITION AND SECURE WITH BEARING CAPS, WASHERS, AND SCREWS. INSTALL PLATES WHEN INSTALLING REAR BEARING LOWER HALF.

Figure 6-44. Main bearings and crankshaft, removal and installation (sheet 1 of 2).

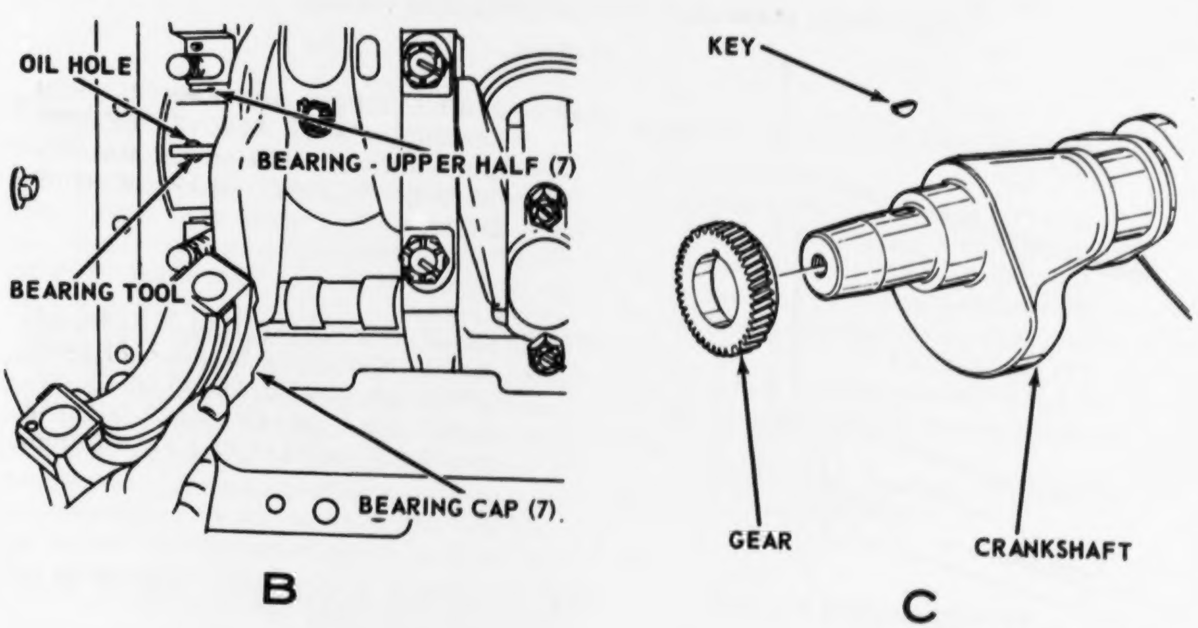


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Figure 6-44. Main bearings and crankshaft, removal and installation (sheet 2 of 2).

(9) Lift crankshaft from engine by attaching a cable around bearing surfaces for number one and number five connecting rods. Tighten cable just enough to prevent crankshaft from moving when main bearing caps are removed.

b. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry all parts thoroughly. Be sure all oil holes are clean and clear of any obstructions.

(2) Inspect main bearings for cracks, excessive wear, burrs, high spots, distortion, or any other defect. A rough or abrasive bearing surface will cause excessive crankshaft wear. Replace bearings as a complete set.

NOTE

Abrasive materials may roll around between bearings and crankshaft journals causing scratches in the bearing without actually becoming embedded in the aluminum. Such scratches are not necessarily harmful and do not indicate that bearings should be replaced.

(3) Inspect crankshaft, for cracks, distortion, rough or abrasive journal surfaces, or any other defect.

NOTE

Rough, worn, or scored journal surfaces can be ground to 0.010, 0.020, or 0.030 inches undersized and used with matching main bearings.

(4) Measure diameter of main bearing journals on crankshaft. Standard size should measure 3.499 to 3.500 inches. Measure diameter of connecting rod journals. Standard size should measure 2.999 to 3.000 inches.

(5) Inspect oil seals for deterioration, cracks, distortion, or any other defect.

(6) Inspect attaching hardware for damaged threads, distortion, cracks, or any other damage.

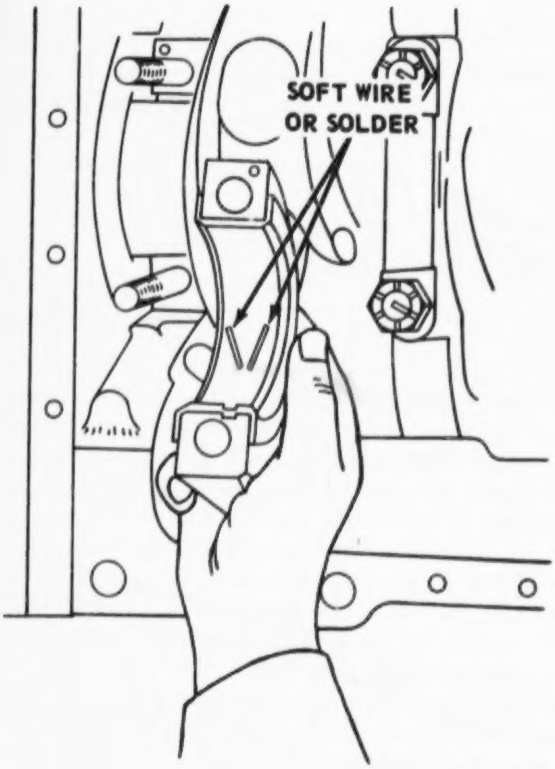
c. Installation.

(1) Install crankshaft assembly and main bearings as shown in figure 6-44. Use same procedure and precautions as when removing crankshaft. Before installing lower half of main bearings, perform step (2) below.

(2) Check main bearing clearance as follows:

(a) Cut two one-inch length of very soft wire or solder for each bearing.

(b) Place two pieces of wire on each bearing lower half as shown in figure 6-45. Coat wire lightly with grease to hold them in place.



ME 4310-338-15/6-45

Figure 6-45. Main bearing clearance check.

(c) Hold crankshaft firmly against upper halves of main bearings and install lower halves of bearings and caps.

(d) Rotate crankshaft at least one revolution. Continue to hold crankshaft against upper halves of bearings. Remove caps and bearings.

(e) Measure thickness of wires to obtain main bearing clearance. Clearance should be 0.0030 to 0.0059 inches.

(3) Reinstall lower halves of bearings and caps as shown in figure 6-44.

(4) Measure crankshaft end clearance by pushing crankshaft as far as it will go to one end of cylinder block and measuring clearance between machined face of crankshaft flange and flange of lower half of rear main bearing. Clearance should be 0.0060 to 0.0180 inches.

(5) Install oil pump assembly (para 6-30).

(6) Install flywheel and flywheel housing (para 6-32).

(7) Install oil pan and plate (para 6-29).

(8) Install timing gear cover (para 6-37).

(9) Install water pump (para 3-76).

(10) Install engine assembly (para 6-13).

Section XVIII. CAMSHAFT AND BEARINGS

6-40. General

The camshaft is located on the upper left side of the cylinder block and is driven by the camshaft gear. The camshaft is supported in the block by bearings and positioned by a thrust washer secured to the cylinder block. The cams are forged integrally with the shaft. As the camshaft turns, the cams move push rods which actuate the inlet and exhaust valves at the timed sequence that effects proper engine operation.

6-41. Camshaft Assembly and Bearings

a. Removal.

(1) Remove engine assembly (para 5-13).

(2) Remove valve cover (para 3-116).

(3) Remove timing gear cover (para 6-37).

(4) Remove camshaft and gear as shown in figure 6-46. Removal of bearings is optional. If bearings are to be removed, perform preliminary steps *(a)* through *(c)*.

(a) Remove oil pan and plate (para 6-29).

(b) Remove oil pump assembly (para 6-30).

(c) Remove flywheel and flywheel housing (para 6-32).

(5) Press gear from camshaft

b. Cleaning and Inspection.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

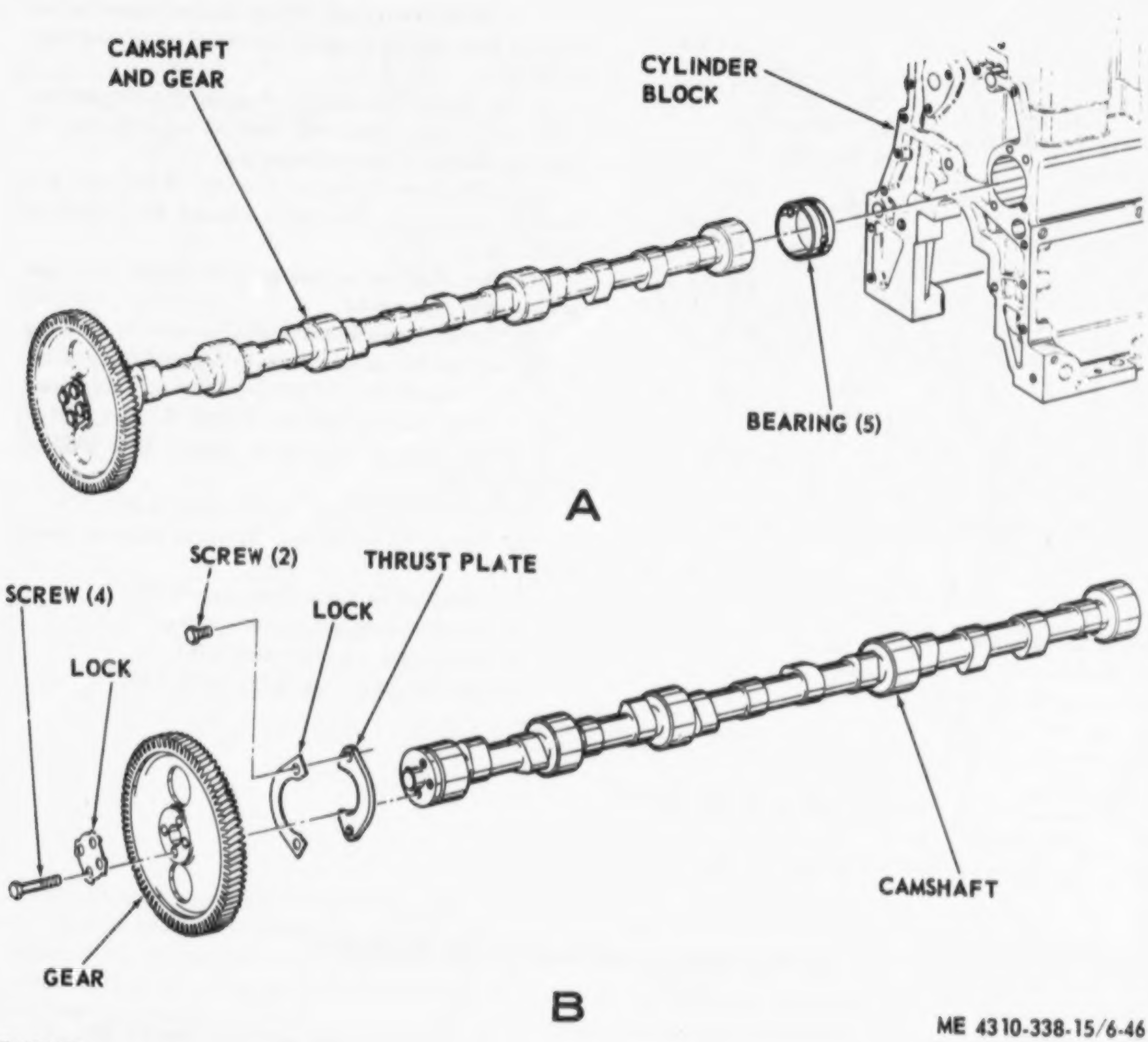
(2) Inspect camshaft for cracks, breaks, chipping, excessive wear, or any other defect.

(3) Measure bearing journal diameter. Measurement should be 2.3105 to 2.3115 inches.

(4) Measure bearing clearance. Measurement should be 0.002 to 0.006 inches.

(5) Inspect bushings, bearings, and tappets for scoring, cracks, excessive wear, distortion, or any other defect.

(6) Inspect all other parts for wear, cracks, distortion, or any other defect.


CAMSHAFT AND GEAR
CYLINDER BLOCK
BEARING (5)
A
SCREW (2)
THRUST PLATE
SCREW (4)
LOCK
LOCK
CAMSHAFT
GEAR
B

ME 4310-338-15/6-46

REMOVAL

STEP 1. REMOVE SCREWS, LOCK, AND THRUST PLATE FROM END OF CAMSHAFT (VIEW B).

STEP 2. REMOVE CAMSHAFT AND GEAR (VIEW A).

STEP 3. REMOVE SCREWS AND LOCK. REMOVE GEAR FROM CAMSHAFT (VIEW B).

STEP 4. PRESS BEARINGS OUT OF CYLINDER BLOCK.

INSTALLATION

STEP 1. PRESS BEARINGS INTO POSITION IN CYLINDER BLOCK.

STEP 2. CAREFULLY INSTALL CAMSHAFT AND SEAT IN BEARINGS.

STEP 3. INSTALL THRUST PLATE AND SECURE WITH SCREWS AND LOCK (VIEW B).

STEP 4. HEAT CAMSHAFT GEAR AND INSTALL ON CAMSHAFT. BE SURE GEAR IS PROPERLY ALIGNED (FIGURE 6-46). SECURE GEAR WITH SCREWS AND LOCK (VIEW B).

Figure 6-46. Camshaft and Bearings; Removal and Installation

c. Installation.

(1) Install camshaft and bearings as shown in figure 6-46. Measure gear end clearance. Measurement should be 0.025 inches maximum. If bearings were removed, perform steps *(a)* through *(c)*.

(a) Install oil pump assembly (para 6-30).

(b) Install flywheel and flywheel housing (para 6-32).

(c) Install oil pan and plate (para 6-29).

(2) Install timing gear cover (para 6-37).

(3) Install valve cover (para 3-116).

(4) Install engine assembly (para 5-13).

Section XIX. PISTONS AND CONNECTING RODS

6-42. General

This group consists of the pistons, piston rings, piston pins, retainers, and connecting rods. The connecting rods contain sleeve bearings at both the piston end and crankshaft end. Each piston has three rings; two compression rings and one oil ring. All rings are located above the piston pin bore. The top compression ring seats in a grooved iron band which is cast integral with the piston. Orifices in the engine block spray oil on the underside of the pistons, thereby cooling the pistons and lubricating the piston pins, cylinder walls and piston rings. Holes intersecting the center of the oil ring groove provide for the return of oil to the crankcase. The connecting rod bearings receive oil through drilled passages in the crankshaft between the main bearing journals and connecting rod journals.

6-43. Pistons and Connecting Rods

a. Removal.

(1) Remove engine assembly (para 5-13).

(2) Remove turbocharger assembly (para 3-115).

(3) Remove cylinder head assembly (para 6-27).

(4) Remove oil pan and plate (para 6-29).

(5) Remove piston and connecting rod assemblies as shown in figure 6-47. As each piston is removed, rotate crankshaft until that piston is at top dead center. Carefully remove each piston by pushing it out through top of cylinder block.

b. Disassembly. Disassemble pistons and connecting rods as shown in figure 6-48.

NOTE

Keep bearing halves together with their respective caps and connecting rods.

c. Cleaning and Inspection.

CAUTION

Do not use broken rings or carbon scrapers on ring lands since this practice can result in cutting sides of grooves. Be sure bottom of each ring groove is clean and oil return holes in oil ring grooves are open.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. If pistons have much carbon on them, soak pistons in cold water overnight and then let them dry (preferably in sunlight). Most of the carbon can then be removed with a hardwood stick.

(2) Inspect pistons for excessive wear, burned condition, cracks, distortion, galling, or any other defect.

(3) Inspect piston pins and rod bearings for scoring, galling, distortion, cracks, or any other defect. Measure diameter of piston pins. Diameter should be 1.6997 to 1.7000 inches. Measure pin clearance in rod bearing. Clearance should be 0.006 inches maximum.

(4) Inspect connecting rods for cracks, breaks, distortion, or any other defect.

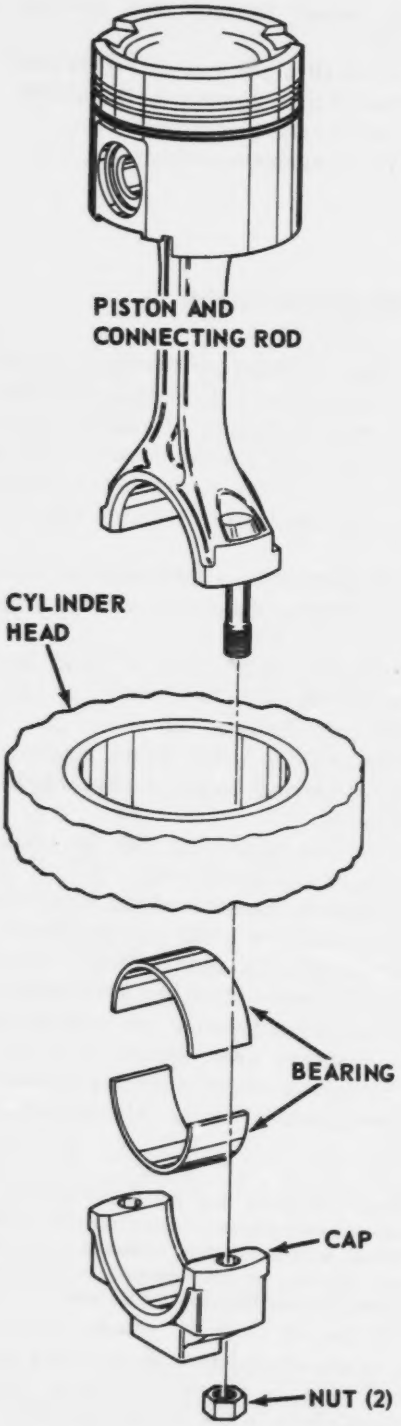
(5) Measure diameter of piston pin bearing bore. Diameter should be 1.7009 to 1.7015 inches. Measure center-to-center distance between connecting rod bearings. Distance should be 9.594 to 9.596 inches.

(6) Inspect connecting rod bearings for scoring, cracks, excessive wear, distortion, or any other defect. A rough or abrasive bearing surface will cause excessive crankshaft wear. Always replace bearings in sets.

NOTE

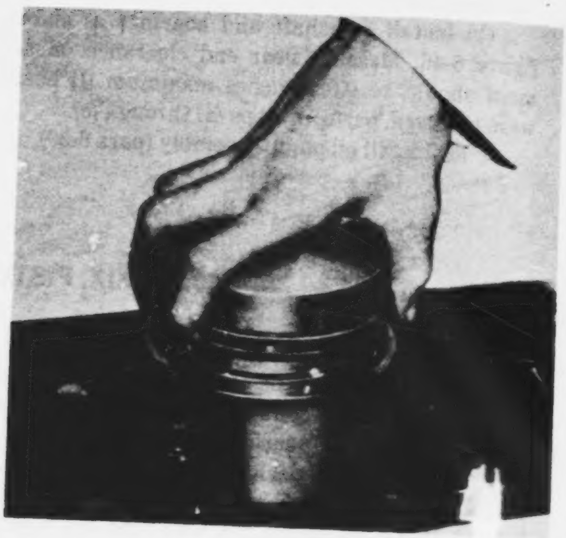
Abrasive materials may roll around between bearings and crankshaft journals causing scratches in the bearing without actually becoming embedded in the aluminum. Such scratches are not necessarily harmful and do not indicate that bearings should be replaced.

(7) Inspect rings for cracks, breaks, excessive wear, or any other defect. Measure end gap clearance for each ring. To measure clearance, insert a piston in cylinder bore in the inverted position. Insert each ring, one at a time, about two inches down in the cylinder bore and bring the bottom edge of the piston up against the ring to square the ring in the cylinder bore. Check gap with a feeler gage. Refer to Table 5-1 for gap clearances. If gap clearance for any ring is not as specified, the ring must be filed or honed to specification, or replaced.



A PISTON REMOVAL

Figure 6-47. Pistons and connecting rods, removal and installation, (sheet 1 of 2).



B PISTON INSTALLATION

Figure 6-47. Pistons and connecting rods, removal and installation, (sheet 2 of 2).

(8) Inspect attaching hardware for cracks, damaged threads, distortion, or any other defect.

d. Reassembly. Reassemble pistons and connecting rods as shown in figure 6-48.

e. Installation.

(1) Install pistons and connecting rod assemblies as shown in figure 6-47.

(a) Lubricate all bearings, piston rings, and the liner walls with clean engine oil.

(b) Insert piston and connecting rod into each liner using a piston ring compressor tool.

(c) Install piston so that cylinder number stamped on side of connecting rod will be visible from inspection cover opening.

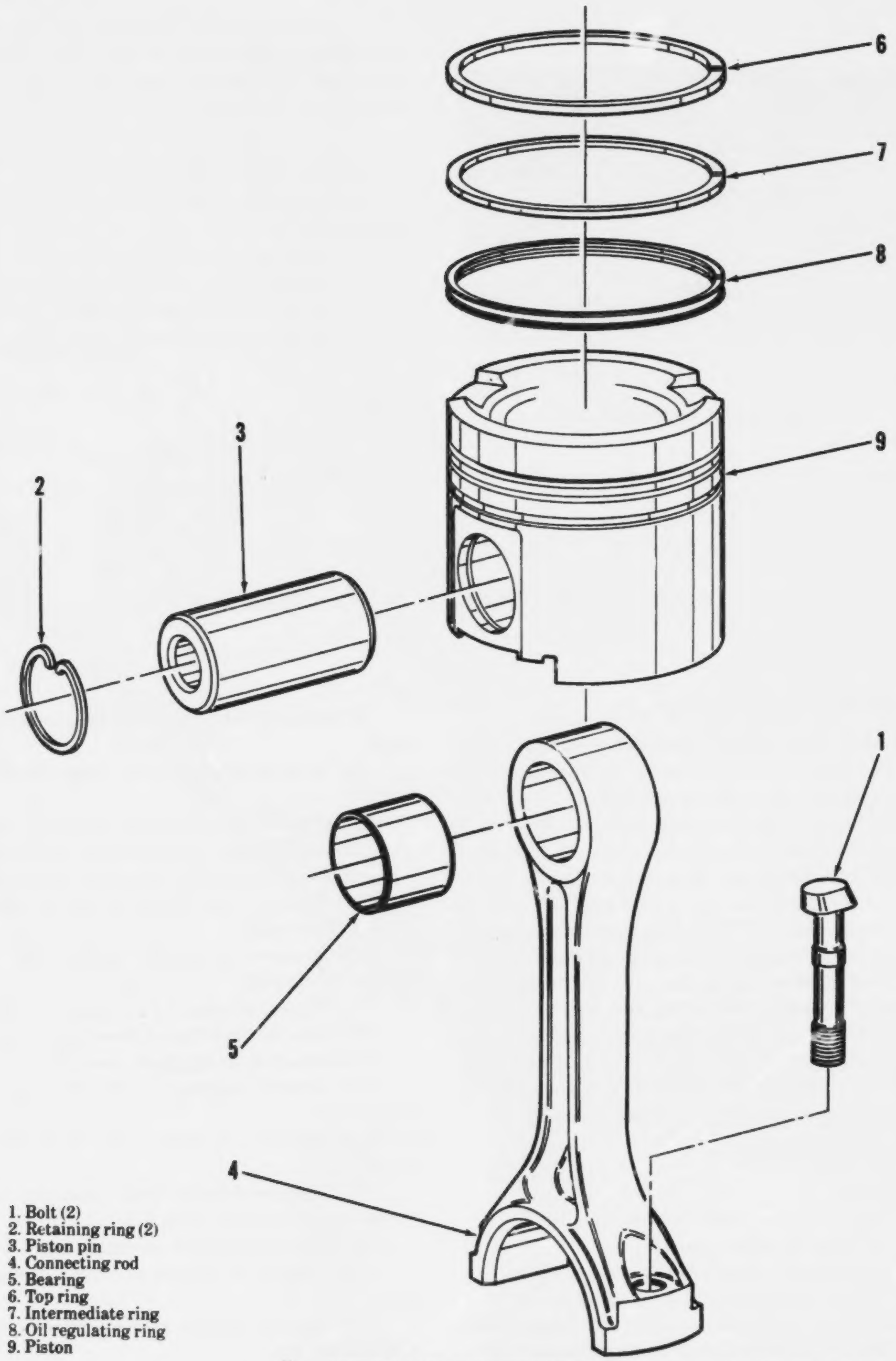
(d) Guide lower end of each connecting rod over crankshaft journal so as not to damage crankshaft bearing surface.

(2) Check connecting rod bearing clearance as follows:

(a) Cut one length of very soft wire or solder for each bearing. The length of each wire should be the same as width of bearing.

(b) Place a piece of wire or solder on each bearing lower half as shown in figure 6-45. Coat wire lightly with grease to hold it in place.

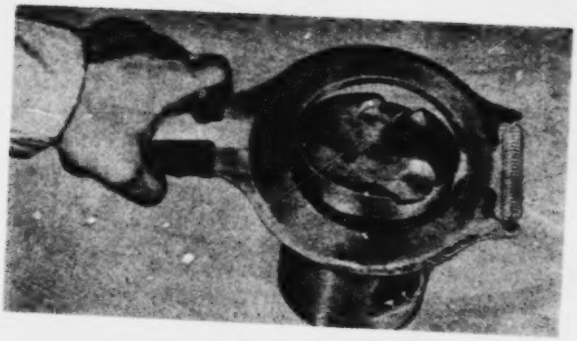
(c) Attach bearings and caps as shown in figure 6-47. Be sure cap nuts are tightened to proper torque.



1. Bolt (2)
2. Retaining ring (2)
3. Piston pin
4. Connecting rod
5. Bearing
6. Top ring
7. Intermediate ring
8. Oil regulating ring
9. Piston

A PISTON AND CONNECTING ROD ME 4310-338-15/6-48 ①

Figure 6-48. Pistons and connecting rods; disassembly and reassembly (sheet 1 of 2).


ME 4310-338-15/6-48 ②

B RING EXPANDER

Figure 6-48. Pistons and connecting rods, disassembly and reassembly, (sheet 2 of 2).

(d) Remove caps and bearings, one at a time, and measure thickness of wire. This measurement represents the bearing clearance. Clearance should 0.010 inches maximum.

NOTE

Excessive bearing clearance can also be an indication of crankshaft bearing surface being out-of-round.

(3) Complete installation of bearings and caps as shown in figure 6-47.

(4) Install oil pan and plate (para 6-29).

(5) Install cylinder head assembly (para 6-27).

(6) Install turbocharger assembly (para 3-115).

(7) Install engine assembly (para 5-13).

Section XX. CYLINDER BLOCK ASSEMBLY

6-44. General

The cylinder block assembly consists of a cast cylinder block, which forms the main structural part of the engine, and replaceable cylinder liners. The liners complete the water jacket of the cylinder block when they are installed. The cylinder block has passages that carry coolant to and around the cylinder liners and other passages that carry lubricating oil to all moving parts. Seals on the liners prevent leakage of coolant into the engine lubricating system. The flywheel housing attaches to the rear of the cylinder block and the timing gear cover and water pump to the front end of the block. The oil pan and plate attach to the bottom of the cylinder block. A compression gasket forms a tight seal between the cylinder block assembly and the cylinder head assembly.

6-45. Cylinder Block

a. *Removal.*

(1) Remove engine assembly (para 5-13).

(2) Remove fan pulley (para 3-77).

(3) Remove water pump assembly (para 3-76).

(4) Remove generator assembly (para 3-102).

(5) Remove starting motor assembly (para 3-105).

(6) Remove turbocharger assembly (para 3-115).

(7) Remove oil filter and oil cooler assemblies (para 3-108 and 3-109).

(8) Remove oil filler and crankcase breather assembly (para 3-110).

(9) Remove fuel transfer pump assembly (para 3-95).

(10) Remove primary fuel filter assembly (para 3-97).

(11) Remove final fuel filter assembly (para 3-98).

(12) Remove fuel pump starting tank (para 3-99).

(13) Remove governor assembly (para 6-17).

(14) Remove fuel injection pump housing assembly (para 6-20).

(15) Remove crankshaft pulley and vibration damper (para 6-36).

(16) Remove oil pan and plate (para 6-29).

(17) Remove timing gear cover (para 6-37).

(18) Remove timing gears (para 6-37).

(19) Remove accessory drive shaft and housing (para 6-34).

(20) Remove flywheel and flywheel housing (para 6-32).

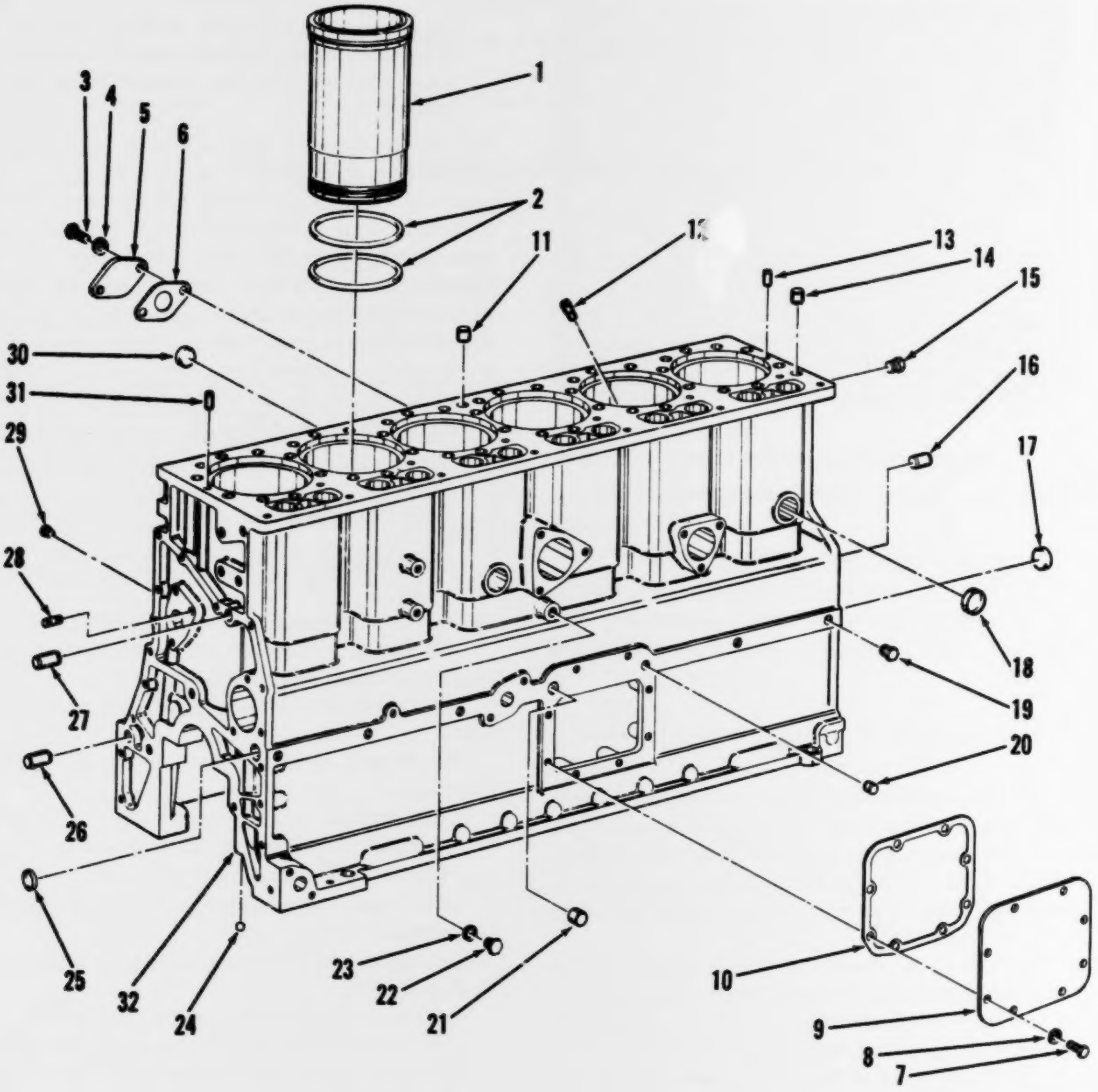
(21) Remove cylinder head assembly and valve operating mechanism (para 6-27).

(22) Remove camshaft assembly (para 6-41).

(23) Remove crankshaft and main bearings (para 6-39).

(24) Remove pistons, connecting rods, and bearings (para 6-43).

b. *Disassembly.* Disassemble cylinder block assembly in numerical sequence shown in figure 6-49. Use a hydraulic puller to remove cylinder liners as shown in figure 6-50.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1. Cylinder liner (6)
2. O-Ring (12)
3. Screw (2)
4. Washer (2)
5. Cover
6. Gasket
7. Screw (8)
8. Washer (8)
9. Cover
10. Gasket
11. Dowel pin
12. Orifice (6)
13. Dowel pin (2)
14. Dowel pin
15. Plug
16. Dowel pin (2)
17. Plug
18. Plug (2)
19. Plug (5)
20. Dowel pin
21. Dowel pin
22. Plug
23. Washer
24. Ball
25. Plug
26. Dowel pin
27. Dowel pin
28. Stud
29. Plug
30. Plug
31. Dowel pin
32. Cylinder block

Figure 6-49. Cylinder block; disassembly and reassembly.

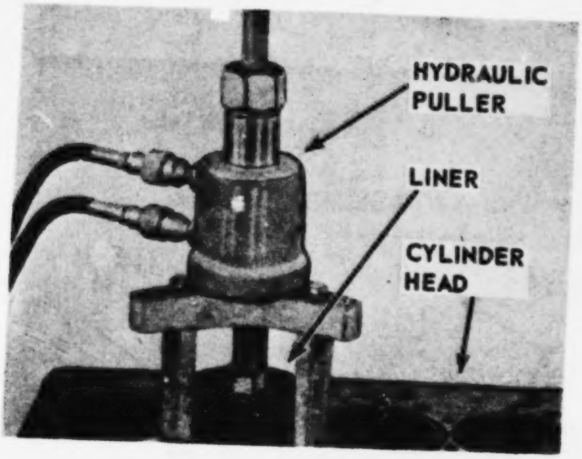

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Figure 6-50. Cylinder liner removal.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard all gaskets and O-rings.

NOTE

Be sure all carbon and hardened deposits are removed.

(2) Inspect cylinder liners for cracks, scoring, distortion, excessive wear, or any other defect. Measure inside diameter of each liner. Diameter should be 4.750 to 4.752 inches for entire length of ring travel. Measure flange thickness. Measurement should be 0.4040 to 0.4056 inches.

(3) Inspect all covers for cracks, breaks, distortion, damaged sealing surfaces, or any other defect.

(4) Inspect cylinder block for cracks, breaks, distortion, leaking freeze plugs, or any other defect.

(5) Check cylinder bores for an out-of-round condition. Measure cylinder liner counterbore diameter. Diameter should be 0.400 to 0.402 inches. Measure main bearing bore diameter. Diameter should be 3.8155 to 3.8165 inches (original bore size).

NOTE

Main bearings must be installed to measure diameter of bearing bore.

(6) Inspect top of cylinder block for grooving or roughness.

(7) Inspect all plugs, studs, and attaching hardware. Check for damaged threads, cracks, breaks, distortion, excessive wear, or any other defect.

d. Reassembly.

CAUTION

To prevent coolant from leaking into engine lubricating system, ensure cylinder liner O-rings are not twisted when installed.

Reassemble cylinder block assembly in reverse numerical sequence shown in figure 6-49. Use new gaskets and O-rings. Lubricate cylinder liner O-rings with liquid soap to ease installation. Carefully lower each cylinder liner into block. Drive each liner into cylinder block until each bottoms, then hit block of wood several taps to assure liner is in. If last blow bottoms liner too hard, liner may bounce back slightly. Properly installed liners must extent 0.0020 to 0.0056 inches above top surface of block to ensure proper holding and sealing of liner against cylinder head gasket when cylinder head is tightened down.

e. Installation.

(1) Install crankshaft and main bearings (para 6-39).

(2) Install pistons, connecting rods, and bearings (para 6-43).

(3) Install camshaft assembly (para 6-41).

(4) Install cylinder head assembly and valve operating mechanism (para 6-27).

(5) Install flywheel and flywheel housing (para 6-32).

(6) Install accessory drive shaft and housing (para 6-34).

(7) Install timing gears (para 6-37).

(8) Install timing gear cover (para 6-37).

(9) Install oil pan and plate (para 6-29).

(10) Install crankshaft pulley and vibration damper (para 6-36).

(11) Install fuel injection pump housing assembly (para 6-20).

(12) Install governor assembly (para 6-17).

(13) Install fuel pump starting tank (para 3-99).

(14) Install final fuel filter assembly (para 3-98).

(15) Install primary fuel filter assembly (para 3-97).

(16) Install fuel transfer pump assembly (para 3-95).

(17) Install oil filler and crankcase breather assembly (para 3-110).

(18) Install oil filter and oil cooler assemblies (para 3-108 and 3-109).

(19) Install turbocharger assembly (para 3-115).

(20) Install starting motor assembly (para 3-105).

(21) Install generator assembly (para 3-102).

(22) Install water pump assembly (para 3-76).

(23) Install fan pulley (para 3-77).

(24) Install engine assembly (para 5-13).

CHAPTER 7
AIR COMPRESSOR REPAIR INSTRUCTIONS

Section I. THERMAL BYPASS VALVE ASSEMBLY

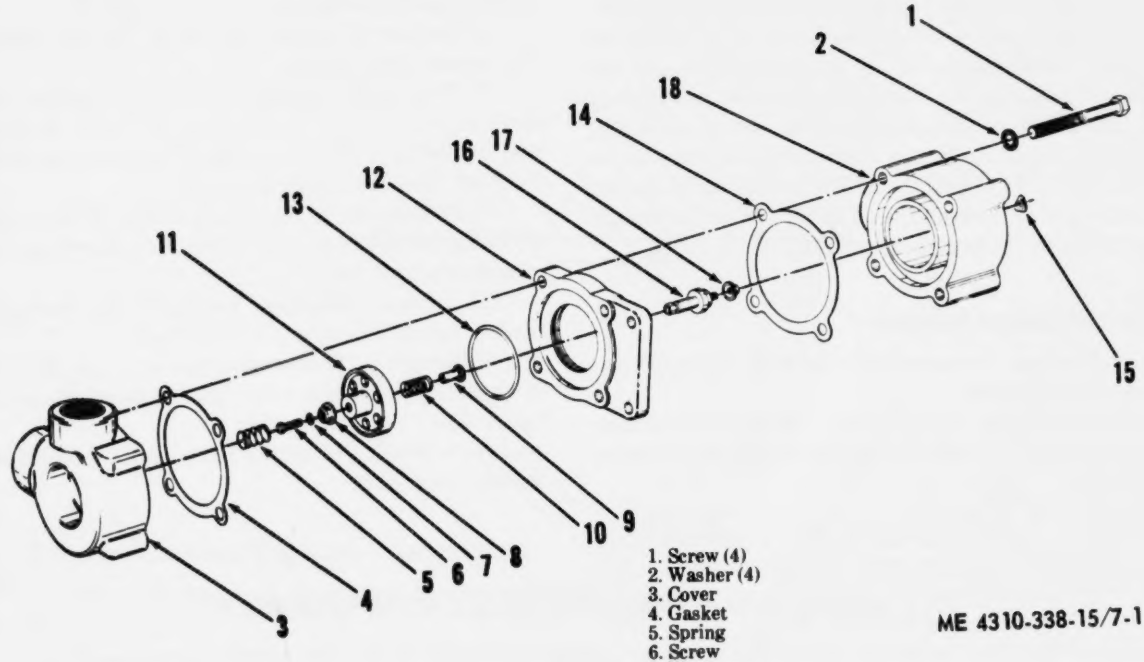
7-1. General

The thermal bypass valve assembly provides rapid warming of the compressor at initial startup by channeling the oil directly from the oil separator, through the oil filter, into the compressor (fig. 5-2). When the oil temperature reaches approximately 150°F., the bypass valve channels part or all of the oil through the oil cooler before it goes to the filter and compressor. Unless the compressor is operating in extremely hot ambient temperatures, the thermal bypass valve will mix the hot oil from the separator and the cool oil from the cooler to maintain a relatively constant minimum operating temperature.

7-2. Thermal Bypass Valve Assembly

a. Removal. Remove thermal bypass valve assembly (para 3-85).

b. Disassembly. Disassemble thermal bypass valve assembly in numerical sequence shown in figure 7-1.



1. Screw (4)
2. Washer (4)
3. Cover
4. Gasket
5. Spring
6. Screw
7. Washer
8. Guide
9. Plunger
10. Spring
11. Shuttle
12. Body
13. O-Ring
14. Gasket
15. Nut
16. Power element assembly
17. Bushing
18. Cover

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Figure 7-1. Thermal bypass valve assembly; disassembly and reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard all gaskets and O-rings.

(2) Inspect covers and body for cracks, breaks, damaged threads, or any other defect.

(3) Inspect springs for cracks, breaks, distortion, or any other defect. Refer to Table 5-2 for spring free lengths.

(4) Inspect power element for distortion, jamming, or any other defect.

(5) Inspect all attaching hardware for damaged threads, distortion, or any other defect.

CAUTION

During reassembly, do not overtighten power element retaining nut. Overtightening can cause distortion, resulting in a malfunction.

d. Reassembly. Reassemble thermal bypass valve assembly in reverse numerical sequence shown in figure 7-1. Install new gaskets and O-rings.

e. Installation. Install thermal bypass valve assembly (para 3-85).

Section II. OIL COOLER ASSEMBLY

7-3. General

The compressor oil cooler assembly consists of a two-section lower tank connected to an upper tank by a series of open end vertical tubes. Radiator style fins are connected to the tubes. Hot oil from the oil separator enters one section of the lower tank and flows upward through one-half of the vertical tubes to the upper tank. The oil then flows downward through the other half of the tubes into the second section of the lower tank. From this section, the oil flows to the compressor via the oil filter. The fins on the tubes act as a heat sink, cooling the oil as air is drawn through the cooler by the engine driven fan.

7-4. Oil Cooler Assembly

a. Removal. Remove radiator and oil cooler assembly (para 3-73).

b. Disassembly. Disassemble radiator and oil cooler assembly in numerical sequence shown in figure 6-10.

c. Cleaning, Inspection, and Repair.

(1) Clean oil cooler using a cleaning solvent that is in accordance with Federal specification P-D-680. Flush interior of oil cooler using the same solvent. Dry oil cooler thoroughly.

(2) Inspect oil cooler for cracks, breaks, distortion, or any other defect.

(3) Plug outlet connection and fill oil cooler with clean oil (refer to LO 5-4310-338-12). Apply air pressure of from 4 to 10 PSI to inlet connection and check for leaks. Mark each leak detected.

(4) Remove air pressure and drain oil from cooler. Solder or braze all leaks detected and recheck by repeating step 3, above.

(5) Inspect attaching hardware for damaged threads, distortion, or any other defect.

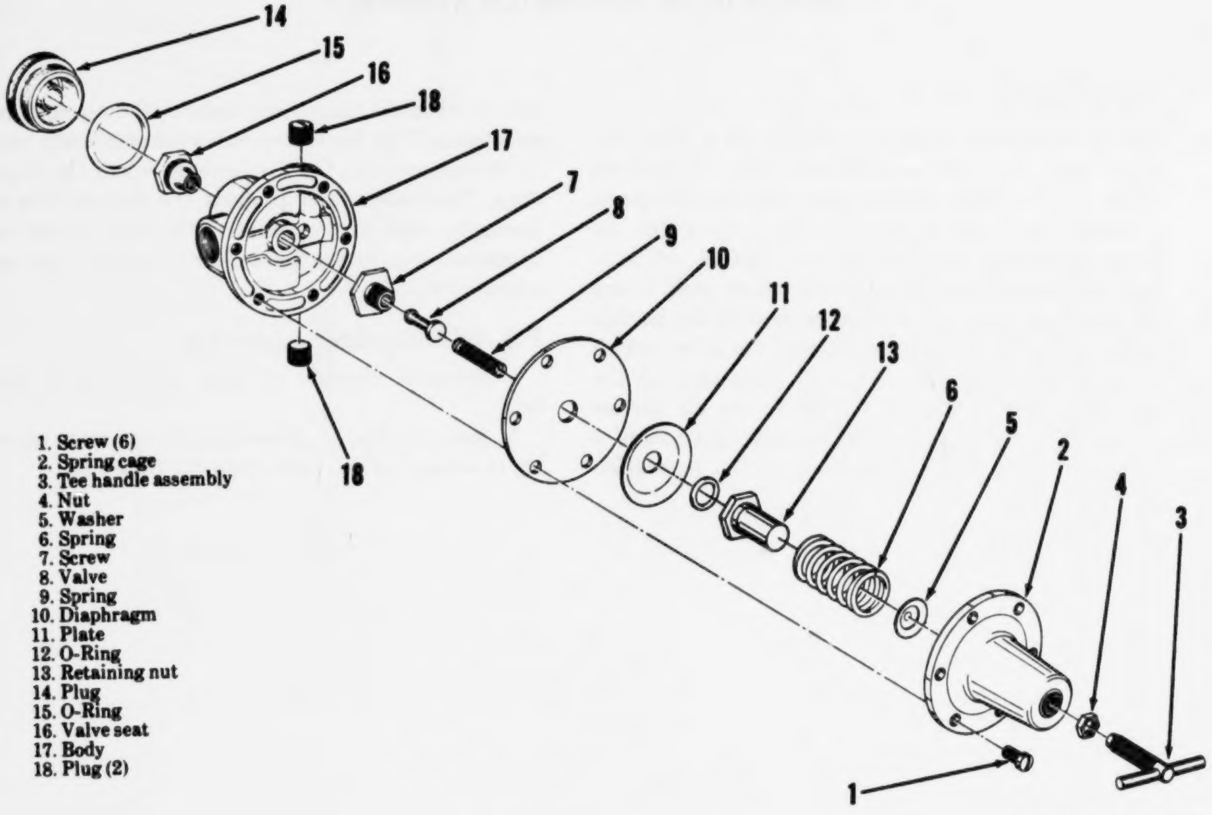
d. Reassembly. Reassemble radiator and oil cooler assembly in reverse numerical sequence shown in figure 6-10.

e. Installation. Install radiator and oil cooler assembly (para 3-73).

Section III. AIR PRESSURE REGULATOR ASSEMBLY

7-5. General

The air pressure regulator assembly controls the intake control valve opening and engine RPM to meet any air output demand within the capabilities of the Model 1M600RPV Rotary Air Compressor. When the compressor is running unloaded, the air pressure regulator also bleeds air into the stator to prevent a vacuum buildup and consequencial blade chattering. Discharge air acting on a valve and spring in the regulator causes the valve to open as air pressure reaches 100 PSI. As the valve opens, it allows air to enter the intake-control between the cover and diaphragm and forces the intake valve closed. As the intake valve closes, engine RPM decreases. As long as air pressure is held at 100 PSI, the intake valve remains closed and the engine RPM remains at low idle. When air is demanded again, the valve in the air pressure regulator closes, which allows the intake control valve to open and engine RPM to increase.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1. Screw (6)
2. Spring cage
3. Tee handle assembly
4. Nut
5. Washer
6. Spring
7. Screw
8. Valve
9. Spring
10. Diaphragm
11. Plate
12. O-Ring
13. Retaining nut
14. Plug
15. O-Ring
16. Valve seat
17. Body
18. Plug (2)
ME 4310-338-15/7-2

Figure 7-2. Air pressure regulator assembly; disassembly and reassembly.

7-6. Air Pressure Regulator Assembly

a. Removal. Remove air pressure regulator assembly (para 3-89).

b. Disassembly. Disassemble air pressure regulator assembly in numerical sequence shown in figure 7-2.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Be sure to remove all sealant that was used during assembly. Discard O-ring and diaphragm.

(2) Inspect springs for defective coils, cracks, distortion, or any other defect.

(3) Inspect valve and seat for excessive wear, distortion, cracks, or any other defect.

(4) Inspect all other parts for distortion, cracks, breaks, excessive wear, or any other defect.

(5) Inspect attaching hardware for damaged threads, distortion, cracks, or any other defect.

d. Reassembly. Reassemble air pressure regulator assembly in reverse numerical sequence shown in figure 7-2. Install a new O-ring and diaphragm. Use sealant when installing valve seat; also use sealant when assembling diaphragm and washer with screw and nut.

e. Installation. Install air pressure regulator assembly (para 3-89).

f. Adjustment. Adjust air pressure regulator assembly (fig. 3-71).

Section IV. OIL SEPARATOR ASSEMBLY

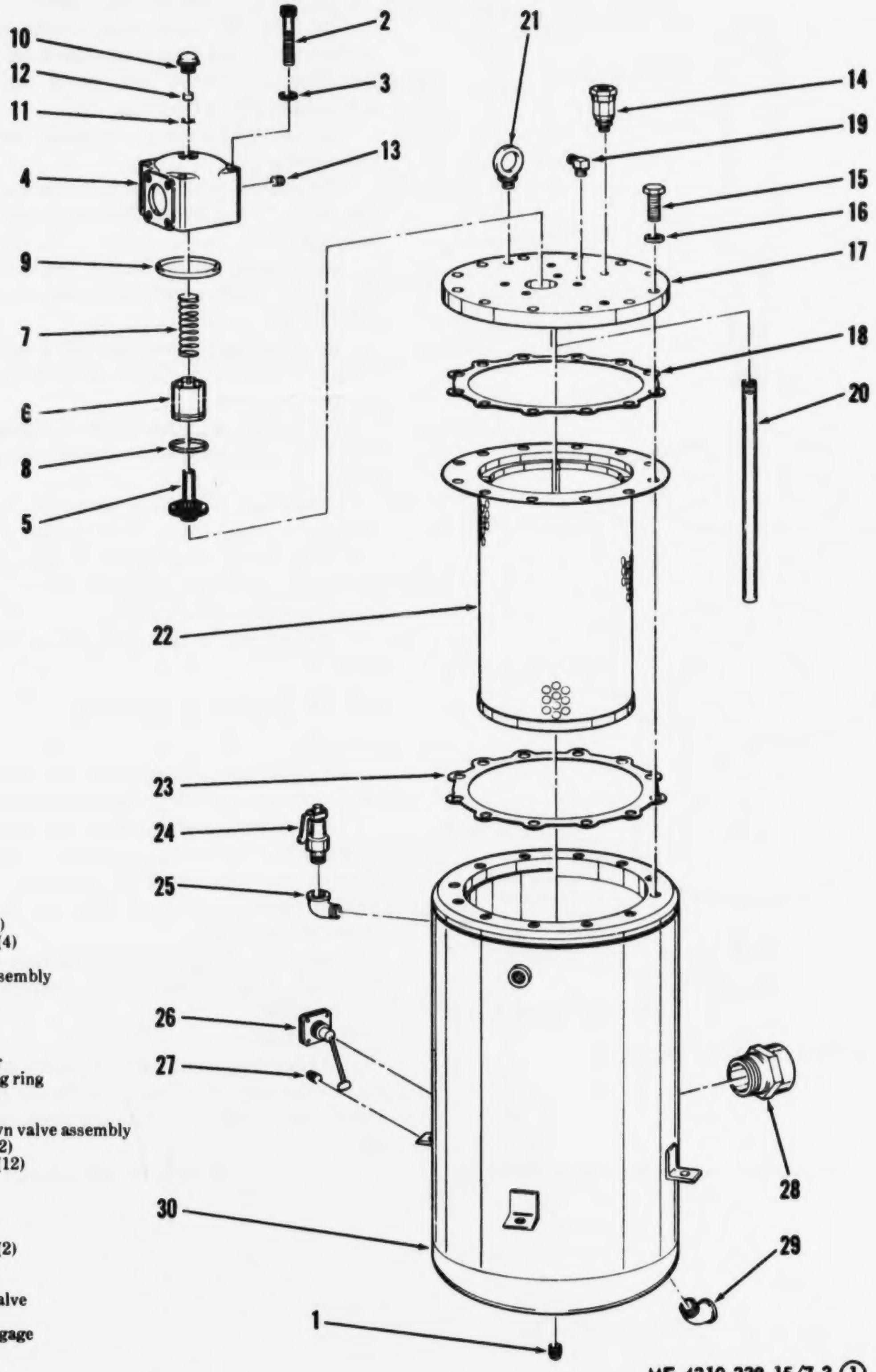
7-7. General

The oil separator assembly consists of a labyrinth type tank, minimum pressure valve, blowdown valve, safety valve, oil level gage, and filter element. A compressed air/oil mixture flows from the air compressor into the oil separator. The air/oil mixture swirls through the labyrinth where most of the oil separates from the air and returns to the bottom of the tank. The air passes through the filter, which removes the remainder of the oil, then through the minimum pressure valve and on to the air service vlaves. The minimum pressure valve maintains a pressure within the tank to effect air/oil separation and to circulate the oil throughout the air compressor system. The blowdown valve automatically vents all air pressure to the atmosphere when the engine stops. The safety valve protects the system from abnormally high air pressure. This valve opens and vents the air to atmosphere if air pressure in the tank exceeds 125 PSI.

7-8. Oil Separator Assembly

a. Removal. Remove oil separator assembly (para 5-11).

b. Disassembly. Disassemble oil separator assembly in numerical sequence shown in figure 7-3.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ME 4310-338-15/7-3 ①
EPARATOR

1. Plug
2. Screw (4)
3. Washer (4)
4. Housing
5. Valve assembly
6. Piston
7. Spring
8. O-Ring
9. O-Ring
10. Breather
11. Retaining ring
12. Felt
13. Plug
14. Blowdown valve assembly
15. Screw (12)
16. Washer (12)
17. Cover
18. Gasket
19. Elbow
20. Nipple
21. Eyebolt (2)
22. Element
23. Gasket
24. Safety valve
25. Elbow
26. Oil level gage
27. Plug (2)
28. Adapter
29. Elbow
30. Tank

Figure 7-3. Oil separator assembly disassembly and reassembly (sheet 1 of 2).

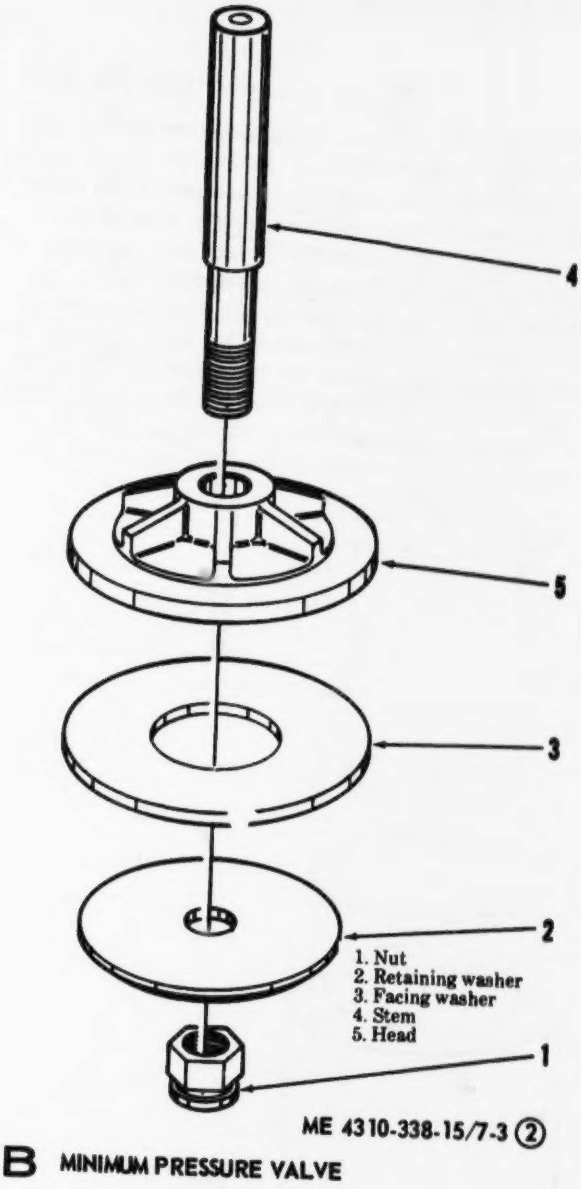


Figure 7-3. Oil separator assembly, disassembly and reassembly (sheet 2 of 2).

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts, except element, using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard all gaskets and O-rings.

(2) Inspect element for holes, varnish, or any other defect.

(3) Inspect all springs for defective coils, distortion, or any other defect. Refer to Table 5-2 for spring free length.

(4) Inspect all minimum pressure valve parts for breaks, cracks, distortion, deterioration, or any other defect.

(5) Inspect oil level gage for cracks, breaks, or improper operation. Check for bending, distortion, or any other defect.

(6) Inspect all other parts (including blowdown valve) for cracks, breaks, distortion, or any other defect.

(7) Inspect attaching hardware for distortion, damaged threads, cracks, or any other defect.

d. Reassembly. Reassemble oil separator assembly in reverse numerical sequence shown in figure 7-3. Install new gaskets and O-rings.

e. Installation. Install oil separator assembly (para 5-11).

7-9. Oil Separator Element

a. Removal.

(1) Disconnect all air lines and piping as necessary for removal of cover (fig. 3-58 and 3-59).

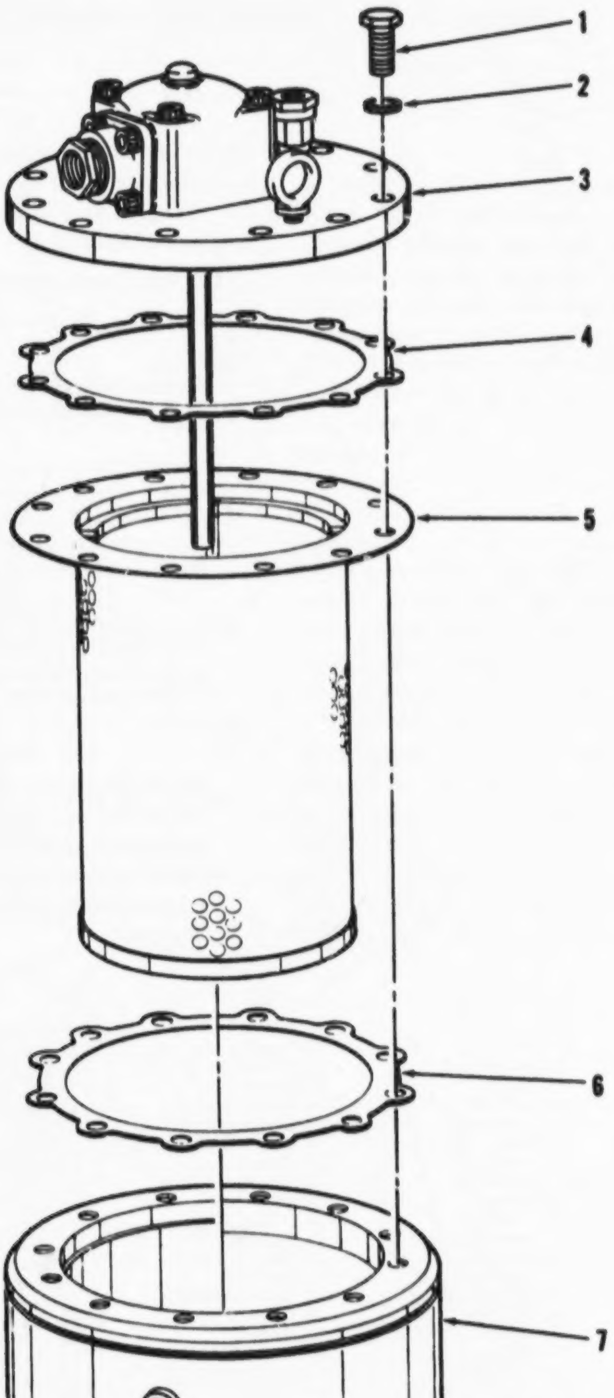
(2) Remove cover, gaskets, and element by following numerical sequence shown in figure 7-4. Air pressure regulator, moisture separator, and bracket can be removed as a unit when oil separator capscrews are removed.

b. Inspection. Inspect element for holes, varnishing, distortion, or any other defect. Inspect gaskets for deterioration.

c. Installation.

(1) Install element, gaskets, and cover by following reverse numerical sequence shown in figure 7-4. Attach moisture separator, air pressure regulator, and bracket to cover.

(2) Connect all air lines and piping (fig. 3-58 and 3-59).



1. Screw (12)
2. Lockwasher (12)
3. Cover
4. Gasket
5. Element
6. Gasket
7. Tank (ref)

ME 4310-338-15/7-4

Figure 7-4. Oil separator element; removal and installation.

Section V. AIR COMPRESSOR ASSEMBLY

7-10. General

Basically, the air compressor assembly consists of the intake control, a cast single stage stator, rotor, rotor blades, end covers, flywheel housing adapter, and coupling. A valve in the intake control unit controls the amount of air that is taken into the compressor and shuts off the air input when a pressure of approximately 115 PSI is reached in the oil separator assembly. When the valve is closed, the compressor is running unloaded. The valve also closes when the compressor shuts down, thereby preventing any oil and air mixture from the rotor-stator from being vented to the atmosphere. When the compressor is running unloaded, a vacuum can develop within the stator and cause internal damage. To prevent this, the air pressure regulator valve causes the intake control valve to open slightly, which allows just enough air input to prevent a vacuum buildup. The compressor also incorporates spring loaded drain valves which prevent hydraulic locks within the stator. The rotor is mounted in the stator housing on a shaft which protrudes through the end covers and rotates on two roller bearings. Air and oil is drawn into the stator and compressed by the action of the rotor and blades. The compressed air/oil mixture is discharged into the oil separator where a labryrinth chamber and filter separate the oil from the air. The air is then passed on to the service valves and the oil is recirculated into the compressor. The air compressor develops an air flow of 600 CFM at a discharge pressure of 100 PSI.

7-11. Air Compressor Assembly

a. Removal. Remove air compressor assembly (para 5-12).

b. Disassembly. Disassemble air compressor assembly in numerical sequence shown in figure 7-5.

NOTE

Do not disassemble drive end cover-rotor combination except to replace defective parts. If an inspection reveals that any of these parts are defective and need to be replaced, refer to paragraph c, below.

c. Drive End Cover-Rotor Disassembly.

NOTE

It is recommended that the drive end cover-rotor combination not be disassembled unless an inspection reveals defective parts that need replacing.

(1) Disassemble in numerical sequence shown in figure 7-6.

CAUTION

Since excessive heat causes softening of the metal, any inner race heated in the following manner must be discarded and the entire bearing replaced. Never heat inner race unless it is intended to replace entire bearing.

1. Nut
2. Bolt
3. Lockwasher
4. Clamp
5. Screw (2)
6. Lockwasher
7. Guide
8. Gasket
9. Bushing
10. O-Ring
11. Screw (8)
12. Lockwasher (8)
13. Cover
14. Push rod
15. Diaphragm
16. Cylinder
17. Gasket
18. Screw
19. Lockwasher
20. Piston
21. Spring
22. Stem
23. Guide
24. Spring
25. Intake valve
26. Screw (5)
27. Lockwasher (5)
28. Cover
29. Gasket
30. Screw (2)
31. Screw (4)
32. Lockwasher (6)
33. Intake connection
34. Gasket
35. Tube
36. O-Ring (2)
37. Screw (4)
38. Screw (2)
39. Lockwasher (6)
40. Body
41. Gasket
42. Elbow
43. Plug
44. O-Ring
45. Spring
46. Ball
47. Screw (8)
48. Lockwasher (8)
49. Cover
50. Gasket
51. Screw (8)
52. Seal washer (8)
53. End cover
54. O-Ring
55. Baring
56. Plug
57. Screw (2)
58. Lockwasher (2)
59. Retainer
60. Collet
61. Coupling
62. Key
63. Collet
64. Secrew (8)
65. Seal washer (8)
66. Adapter
67. Gasket
68. Screw (8)
69. Lockwasher (8)
70. Cover
71. Gasket
72. Plug
73. Oil Seal
74. Seal sleeve
75. O-Ring
76. Locking sleeve
77. O-ing
78. Bearing ring
79. End cover/rotor
80. Blade
81. O-Ring
82. Plug (4)
83. O-Ring (4)
84. Spring (4)
85. Valve (4)
86. Valve
87. O-Ring
88. Ball
89. Pin
90. Eye bolt
91. Screw (2)
92. Plate
93. Stator

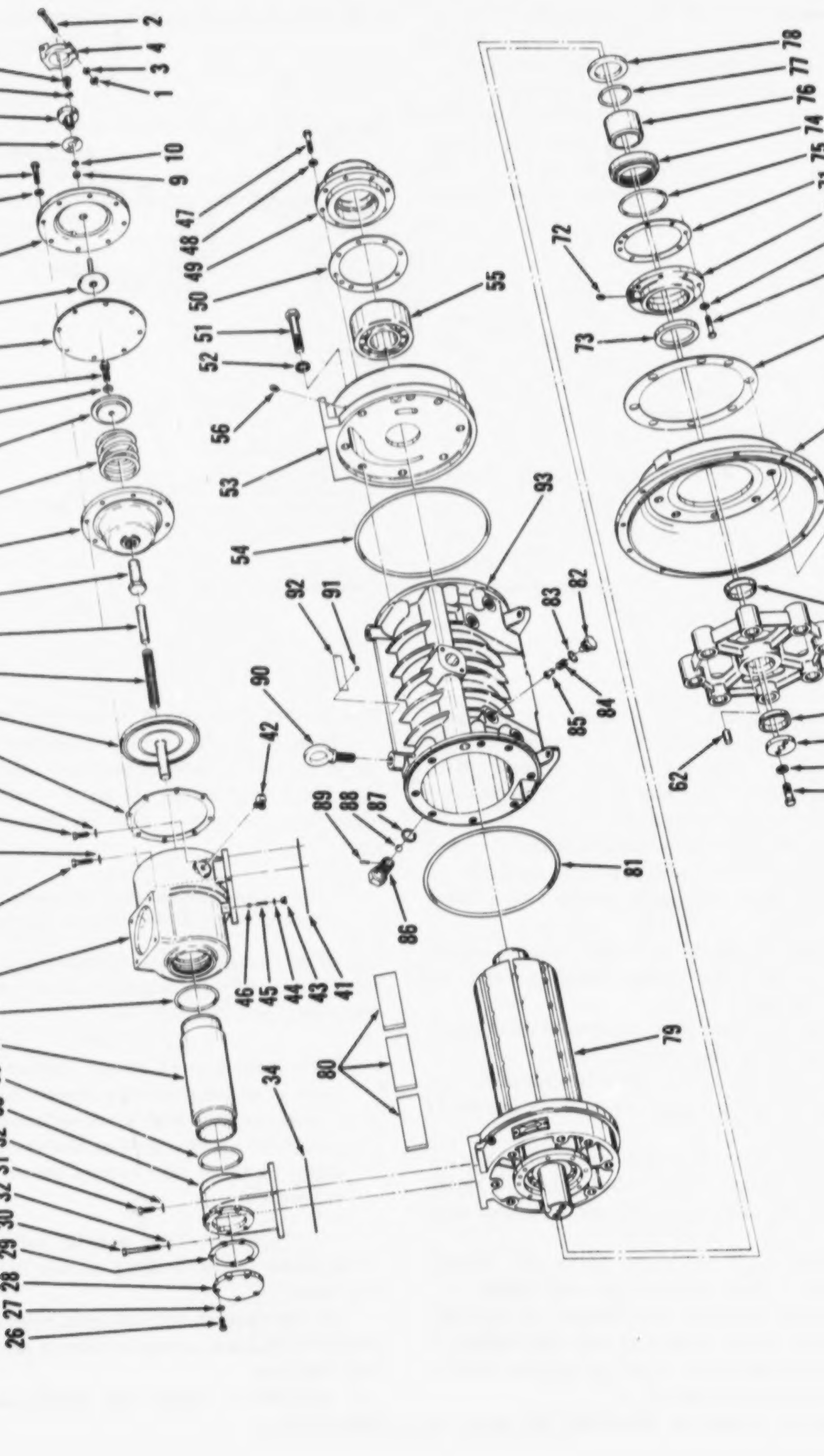

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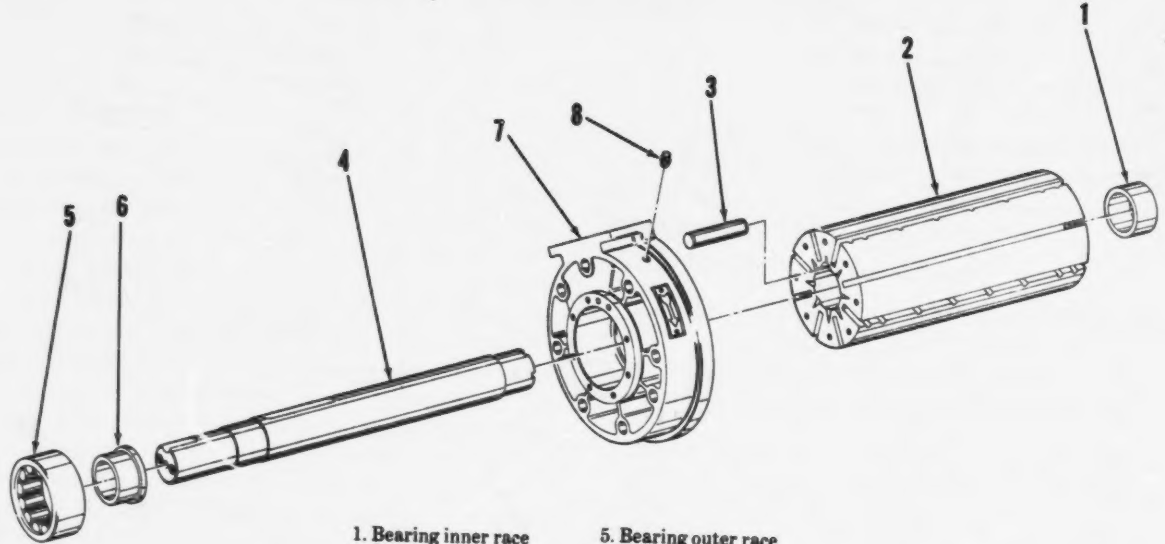
Figure 7-5. Air compressor assembly; disassembly and reassembly.



1. Bearing inner race
2. Rotor
3. Key
4. Shaft
5. Bearing outer race
6. Bearing inner race
7. End cover
8. Connector

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Figure 7-6. Drive end cover-rotor; disassembly and reassembly.

(2) Remove bearing inner races using a gear puller or the equivalent. If either inner race will not move, use a torch and heat race evenly. With heat applied, remove inner race as quickly as possible.

d. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard all gaskets and O-rings.

(2) Inspect all springs for defective coils, cracks, distortion, or any other defect. Refer to Table 5-2 for spring free length.

(3) Inspect intake control diaphragm for rupture, deterioration, or any other defect.

(4) Inspect intake control valve for cracks, distortion, condition of seat, excessive wear, or any other defect.

(5) Inspect rotor blades for cracks, breaks, chipping, excessive wear, or any other defect. If blades are worn on one side only, they can be turned over and reused.

(6) Inspect rotor and stator for cracks, gouges, excessive wear, raised metal, or any other defect.

(7) Inspect bearings for freedom of rotation, excessive wear, cracks, breaks, or any other defect.

(8) Inspect all other parts for cracks, breaks, distortion, or any other defect.

(9) Inspect attaching hardware for damaged threads, distortion, cracks, or any other defect.

e. Reassembly. Reassemble air compressor assembly in reverse numerical sequence shown in figure 7-5, except rotor blades are installed after drive end cover-rotor assembly is installed. Install new gaskets and O-rings.

NOTE

If drive end cover-rotor assembly is disassembled, refer to paragraph *f*, below, for reassembly instruction.

f. Drive End Cover-Rotor Reassembly. Reassemble drive end cover-rotor assembly in reverse numerical sequence shown in figure 7-6.

CAUTION

Do not use a torch or any similar heating method on bearing inner races. Excessive or uneven heat will cause softening of the metal. To prevent galling the shaft, do not allow an inner race to cool before it is installed.

(1) When installing bearing inner races, submerge them in hot cooking oil and heat to 350 ° F. maximum.

(2) Install rotor with oil drain holes in blade slots positioned at leading edge of slots in accordance with rotor rotation.

g. Installation. Install air compressor assembly (para 5-12).

7-12. Air Compressor Rotor Blade Inspection and Replacement

a. Disassembly.

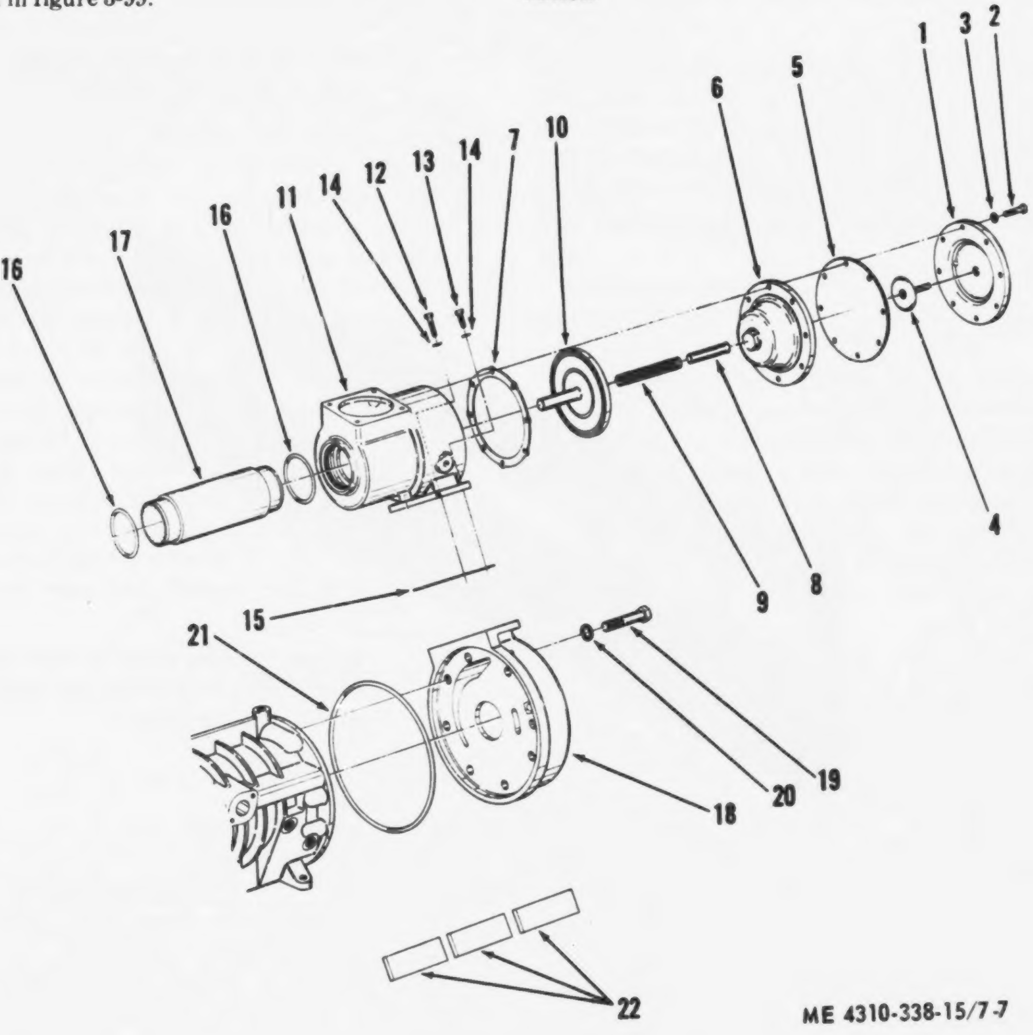
(1) Remove locknut and disconnect stop block from speed control arm.

(2) Remove engine air cleaner assembly and cap as shown in figure 3-99.

(3) Disconnect all air lines at intake-unloader fittings.

(4) Remove elbow on air intake opening.

(5) Remove parts in numerical sequence as shown in figure 7-7. Use a wire bent into a hook on one end to extract rotor blades from slots at top of rotor. To bring blades into position at top of rotor, engine must be rotated by repeatedly pressing start button.



1. Cover assembly
2. Screw (8)
3. Washer (8)
4. Push rod
5. Diaphragm
6. Cylinder assembly
7. Gasket
8. Guide
9. Spring
10. Intake valve
11. Body
12. Screw (2)
13. Screw (4)
14. Washer (6)
15. Gasket
16. O-Ring (2)
17. Tube
18. Cover assembly
19. Screw (8)
20. Washer (8)
21. O-Ring
22. Blade (24)

Figure 7-7. Disassembly blade inspection.

b. Inspection. Inspect blades for evidence of excessive wear. See figure 7-8. Blades are worn when 25 per cent of covering per side has been removed, and shiny metal exposed. Blades worn on one side only are to be turned around and reused. Replace blades which have suffered a loss of 1/16-inch in height due to wear. See figure 7-8. Replace blades worn on both sides. Replace blades damaged by scores or chips.

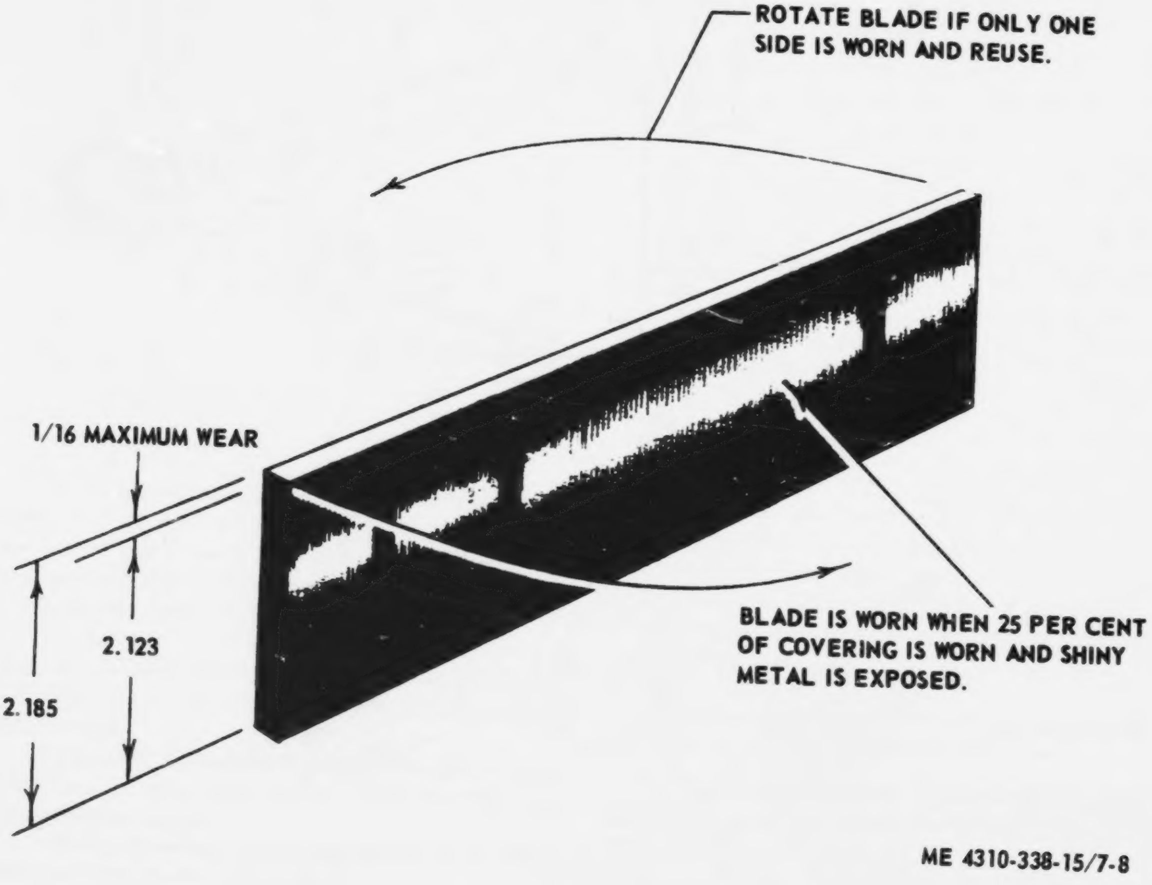

ROTATE BLADE IF ONLY ONE SIDE IS WORN AND REUSE.
1/16 MAXIMUM WEAR
2.123
2.185
BLADE IS WORN WHEN 25 PER CENT OF COVERING IS WORN AND SHINY METAL IS EXPOSED.
ME 4310-338-15/7-8

Figure 7-8. Blade conditions.

c. Reassembly.

(1) Dip new O-rings and new blades in clean compressor oil before installing.

(2) Reassemble in reverse numerical sequence as shown in figure 7-7.

(3) Install elbow on air intake opening.

(4) Connect air lines at intake-unloader fittings.

(5) Install engine air cleaner assembly as shown in figure 3-99.

(6) Connect stop block to speed control arm and secure with locknut.

(7) Start unit (fig. 2-8) and check compressor and air lines for leaks or other malfunctions. Correct any malfunctions by referring to Table 3-2. Troubleshooting.

CHAPTER 8
BRAKES, STEERING, AND AXLE REPAIR INSTRUCTIONS

Section I. BRAKE GROUP

8-1. General

The brake group consists of wedge-actuated service air brakes, spring actuated mechanical parking brakes, service chambers, an emergency relay valve, an air reservoir tank, and associated lines and fittings. The parking brakes are manually controlled using a hand lever that is connected by cables, to an actuating mechanism. Compressed air from the towing vehicle is supplied to the emergency relay valve and air reservoir tank. The emergency relay valve distributes air to a service chamber mounted on each wedge brake assembly. The force from the air chamber is applied to wedges located between plungers inside the wedge brakes. The wedges move forward spreading the plungers apart which moves the brake shoes against the drum. Friction in the wedge actuating mechanism is reduced by the use of rollers located between each plunger and brake applying wedge. If the air pressure from the towing vehicle fails, as in the case of a breakaway or uncoupling, the air from the reservoir tank actuates the service brakes automatically. The tank air pressure will then bleed off and the brakes will release.

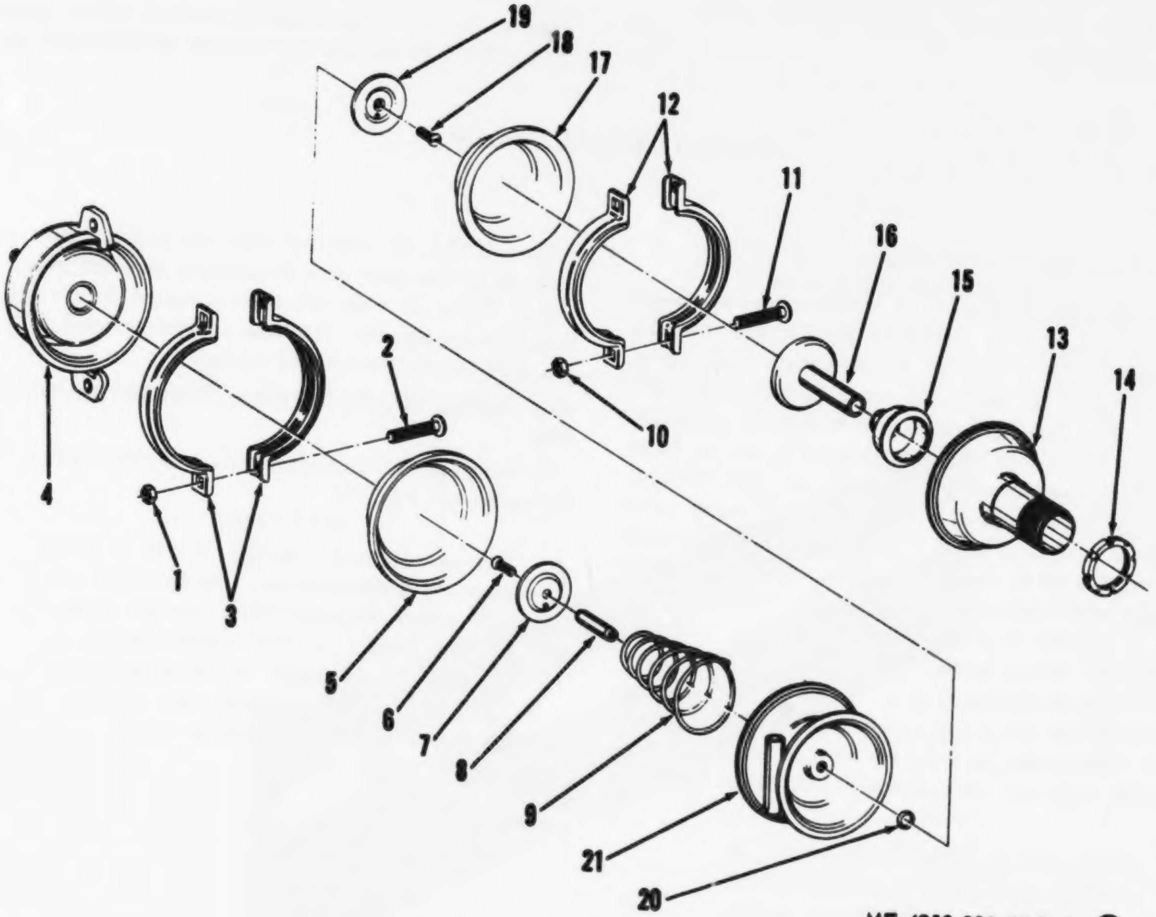
8-2. Spring Brake-Service Chamber Assembly.

a. Removal. Remove spring brake-service chamber assembly (para 3-123).

WARNING

The compression spring exerts a high force when compressed. Use extreme caution when disassembling spring brake. Be sure spring is fully caged before attempting disassembly.

b. Disassembly. Disassembly each spring brake-service chamber assembly in numerical sequence shown in figure 8-1.



ME 4310-338-15/8-1 ①

A SPRING BRAKE-SERVICE CHAMBER ASSEMBLY

1. Nut (2)
2. Bolt (2)
3. Clamp
4. Chamber
5. Diaphragm
6. Screw
7. Plate
8. Push rod adapter
9. Return spring
10. Nut (2)
11. Bolt (2)
12. Clamp
13. Housing
14. Nut
15. Boot
16. Push rod
17. Diaphragm
18. Screw
19. Plate
20. O-Ring
21. Adapter
22. Nut
23. Washer
24. Release stud
25. Cup
26. Pressure plate
27. Compression spring
28. Bushing
29, Chamber

Figure 8-1. Spring brake-service chamber assembly, disassembly and reassembly (sheet 1 of 2).

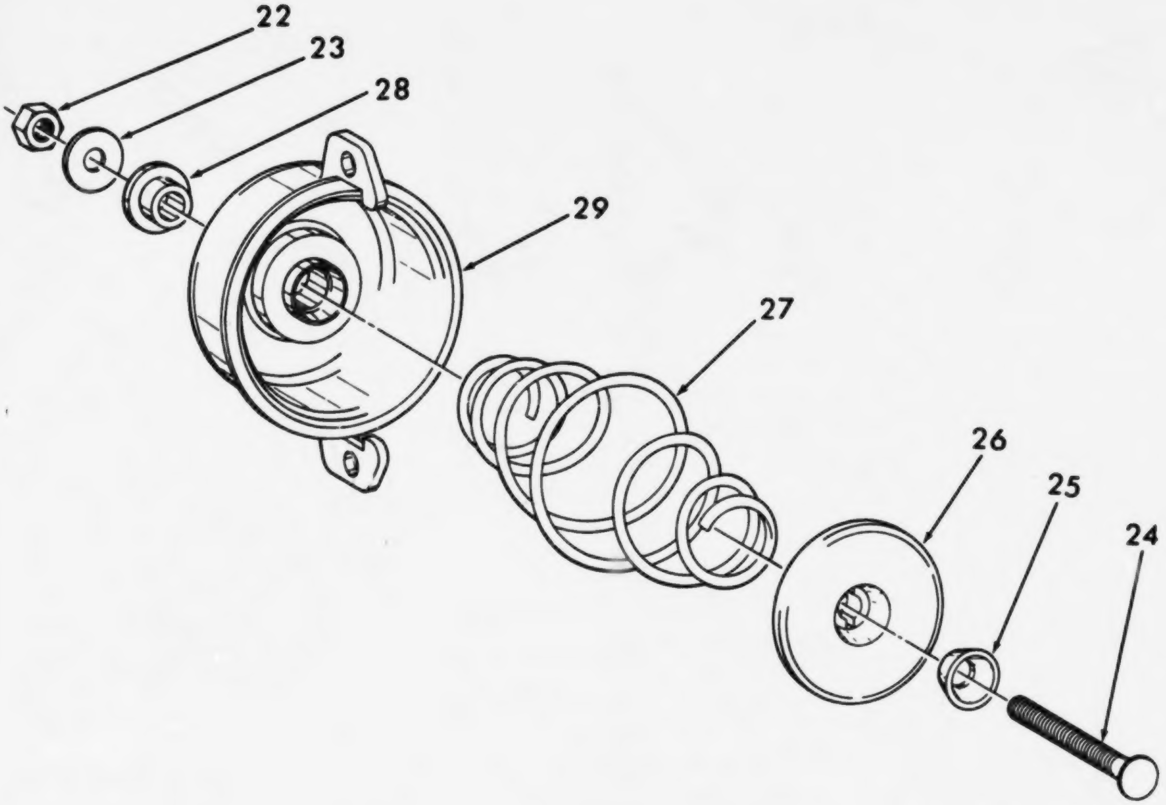


Figure 8-1. Spring brake-service chamber assembly, disassembly and reassembly, (sheet 2 of 2).

NOTE

With compression spring caged, remove clamp; then remove spring chamber as a unit. Carefully disassemble spring chamber.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect springs for cracks, defective coils, breaks, or any other defect.

(3) Inspect diaphragm and boots for cracks, breaks, deterioration, or any other defect.

NOTE

Diaphragms should be replaced at least every 50,000 miles or once a year, whichever occurs first.

(4) Inspect push rods for cracks, breaks, distortion, or any other defect.

(5) Inspect housing assembly and pressure plate for distortion, cracks, condition of sealing surfaces, or any other defect.

(6) Inspect release stud and all other parts for cracks, distortion, damaged threads, or any other defect.

d. Reassembly. Reassemble each spring brake-service chamber assembly in reverse numerical sequence shown in figure 8-1.

NOTE

Assemble spring chamber and cage spring. Assemble spring chamber as a unit using clamp provided.

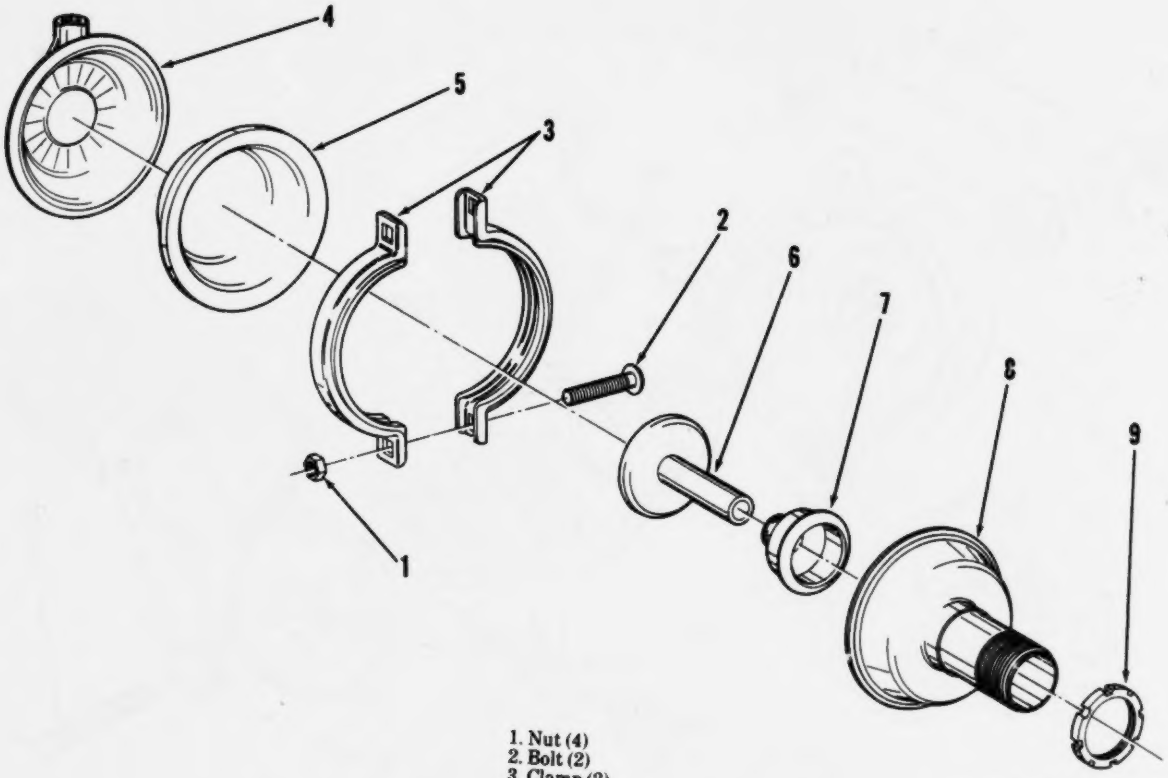
e. Testing. To test service chamber for leaks, charge chamber with air and apply a soapy water solution to all seams. Any bubbling indicates an air leak.

f. Installation. Install spring brake-service chamber assembly (para 3-123).

8-3. Service Chamber Assembly

a. Removal. Remove service chamber assembly (para 3-124).

b. Disassembly. Disassemble service chamber assembly in numerical sequence shown in figure 8-2.



1. Nut (4)
2. Bolt (2)
3. Clamp (2)
4. Pressure cap
5. Diaphragm
6. Push rod
7. Boot
8. Housing
9. Nut

ME 4310-338-15/8-2

Figure 8-2. Service chamber assembly; disassembly and reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect diaphragm and boot for cracks, breaks, deterioration, or any other defect.

NOTE

Diaphragm should be replaced at least every 50,000 miles or once a year, whichever occurs first.

(3) Inspect push rod assembly for cracks, breaks, distortion, or any other defect.

(4) Inspect housing assembly and pressure cap for distortion, cracks, condition of sealing surfaces, or any other defect.

(5) Inspect all other parts for cracks, breaks, distortion, or any other defect.

(6) Inspect attaching hardware for damaged threads, distortion, or any other defect.

d. Reassembly. Reassemble service chamber assembly in reverse numerical sequence shown in figure 8-2.

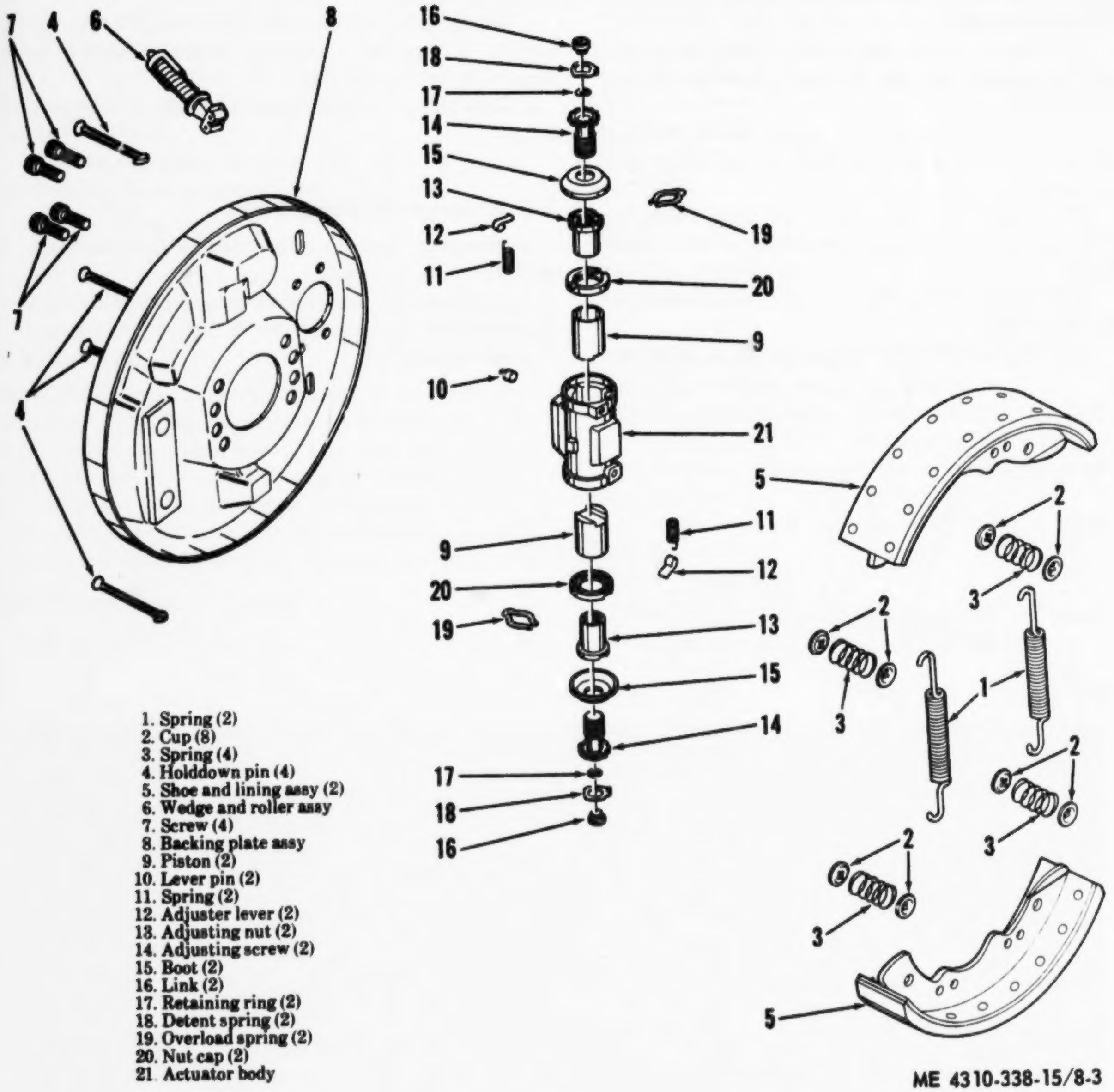
e. Testing. To test service chamber for leaks, charge chamber with air and apply a soapy water solution to all seams. Any bubbling indicates an air leak.

f. Installation. Install service chamber assembly (para 3-124).

8-4. Wedge Brake Assembly

a. Removal. Remove wedge brake assembly (para 3-125).

b. Disassembly. Disassemble wedge brake assembly in numerical sequence shown in figure 8-3.



1. Spring (2)
2. Cup (8)
3. Spring (4)
4. Holddown pin (4)
5. Shoe and lining assy (2)
6. Wedge and roller assy
7. Screw (4)
8. Backing plate assy
9. Piston (2)
10. Lever pin (2)
11. Spring (2)
12. Adjuster lever (2)
13. Adjusting nut (2)
14. Adjusting screw (2)
15. Boot (2)
16. Link (2)
17. Retaining ring (2)
18. Detent spring (2)
19. Overload spring (2)
20. Nut cap (2)
21. Actuator body

Figure 8-3. Wedge brake assembly; disassembly and reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly. Discard boots.

(2) Inspect all springs for defective coils, breaks, cracks, or any other defect. Replace overload spring if test load is less than 13 pounds when ends are compressed to ½-inch apart.

(3) Inspect rod and wedge surfaces, roller surfaces, and plungers for scoring, excessive wear, or any other defect.

(4) Inspect pistons for roughness in roller slots, distortion, cracks, chips, or any other defect.

(5) Inspect spring clips, retainers, and adjusting lever for cracks, breaks, or any other defect.

(6) Inspect actuator castings for roughness in

machined bore. Use emery cloth to remove any raised metal which would interfere with piston movement, then clean casting.

(7) Inspect adjusting screws, links, nuts, and caps for cracks, breaks, damaged threads, or any other defect.

(8) Inspect automatic adjuster levers, springs and pins for corrosion, distrotion, cracks, or any other defect.

(9) Inspect backing plate and shoe holddown parts for cracks, breaks, distortion, or any other defect.

(10) Inspect linings for excessive wear, cracks, or any other defect.

(11) Inspect all other parts, including attaching hardware, for cracks, distortion, excessive wear, or any other defect.

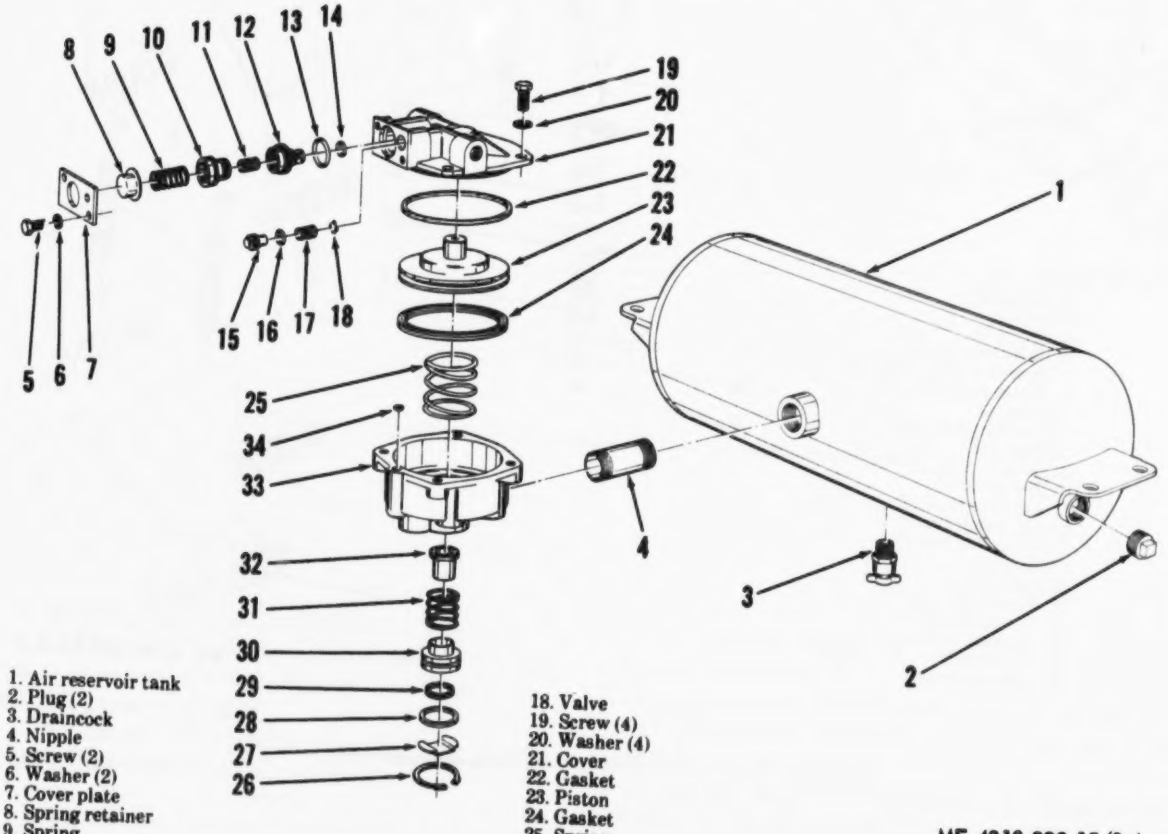
d. Reassembly. Reassemble each wedge brake assembly in reverse numerical sequence shown in figure 8-3. Install new boots.

e. Installation. Install wedge brake assembly (para 3-125).

8-5. Emergency Relay Valve

a. Removal. Remove emergency relay valve (para 3-126).

b. Disassembly. Disassemble emergency relay valve in numerical sequence shown in figure 8-4. Discard O-rings and gaskets.



1. Air reservoir tank
2. Plug (2)
3. Draincock
4. Nipple
5. Screw (2)
6. Washer (2)
7. Cover plate
8. Spring retainer
9. Spring
10. Seat
11. Spring
12. Piston
13. O-ring
14. O-ring
15. Valve retainer
16. O-ring
17. Spring
18. Valve
19. Screw (4)
20. Washer (4)
21. Cover
22. Gasket
23. Piston
24. Gasket
25. Spring
26. Retaining ring
27. Shield
28. Gasket
29. Gasket
30. Valve guide
31. Spring
32. Valve
33. Body
34. O-ring

Figure 8-4. Emergency relay valve; disassembly and reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all metal parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect springs for defective coils, cracks, breaks, or any other defect. Refer to Table 5-2 for spring free length.

(3) Inspect piston, poppets, and valves for cracks, distortion, excessive wear, or any other defect.

(4) Inspect connection ports for damaged threads, distortion, or any other defect.

(5) Inspect body and cover for cracks, distortion, excessive wear, or any other defect.

d. Reassembly. Reassemble emergency relay valve in reverse numerical sequence shown in figure 8-4. Install new O-rings and gaskets.

e. Installation. Install emergency relay valve (para 3-126).

Section II. STEERING AND AXLE GROUP

8-6. General

The steering and axle group consists of the rear axle, front axle, tow bar, and steering components. The axles are 2¾-inch beams with a spindle assembly at each end. The front axle has steering knuckles which are connected to the axle beam by king pins. Tie rods connect from each knuckle to a center steering arm. The tow bar connects to the center steering arm.

8-7. Front Axle Assembly

a. Removal.

(1) Remove tow bar (para 3-132).

(2) Remove front wheels (para 3-121).

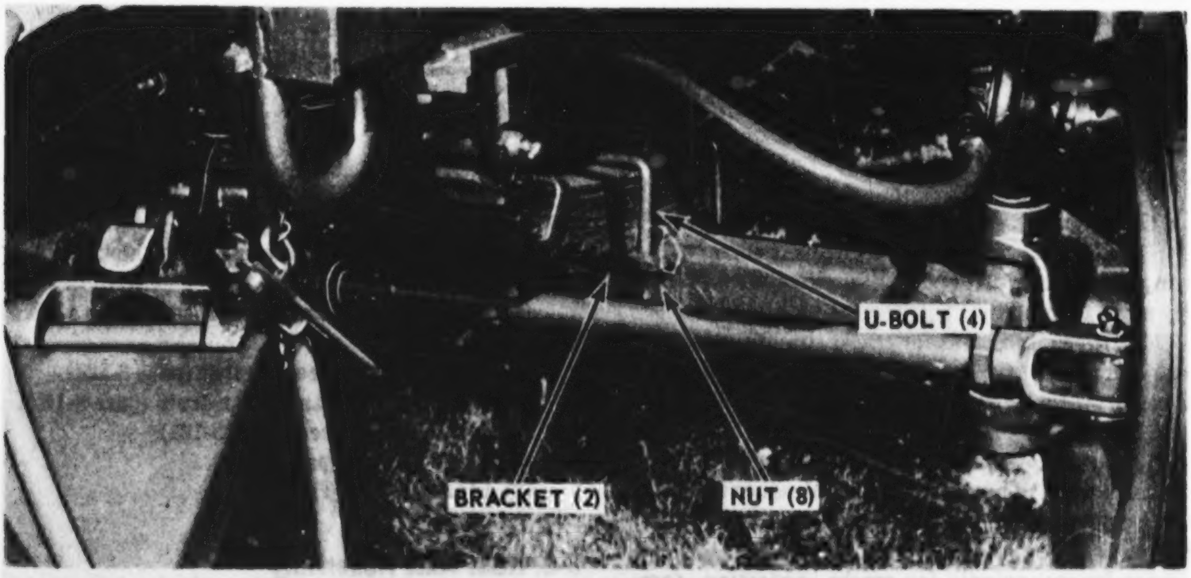
(3) Remove each hub and brake drum (para 3-122).

(4) Remove each service chamber (para 3-124).

(5) Remove each wedge brake assembly as shown in figure 3-113.

(6) Remove front axle assembly as shown in figure 8-5.

b. Disassembly. Disassemble front axle assembly in numerical sequence shown in figure 8-6.



ME 4310-338-15/8-5

REMOVAL

REMOVE NUTS, U-BOLTS, AND BRACKETS. REMOVE AXLE ASSEMBLY.

INSTALLATION

PLACE AXLE ASSEMBLY IN MOUNTING POSITION AND SECURE WITH BRACKETS, U-BOLTS, AND NUTS.

Figure 8-5. Front axle assembly; removal and installation.

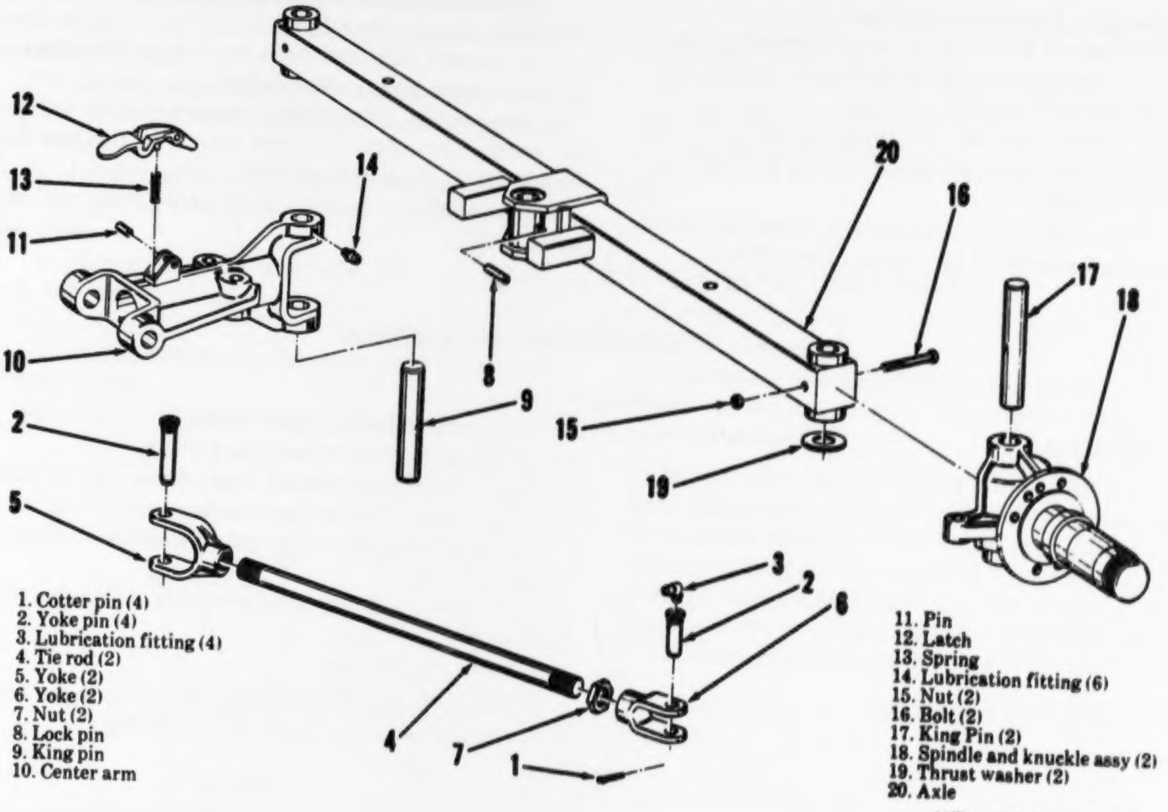

12
13
14
11
20
16
17
18
10
8
9
2
15
19
5
3
2
6
4
7
1
1. Cotter pin (4)
2. Yoke pin (4)
3. Lubrication fitting (4)
4. Tie rod (2)
5. Yoke (2)
6. Yoke (2)
7. Nut (2)
8. Lock pin
9. King pin
10. Center arm
11. Pin
12. Latch
13. Spring
14. Lubrication fitting (6)
15. Nut (2)
16. Bolt (2)
17. King Pin (2)
18. Spindle and knuckle assy (2)
19. Thrust washer (2)
20. Axle

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Figure 8-6. Front axle assembly; disassembly and reassembly.

c. Cleaning, Inspection, and Repair.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect king pins for cracks, breaks, excessive wear, improper fit, or any other defect. Measure diameter of king pins. Diameter should be 1.2380 to 1.2390 inches.

(3) Inspect steering knuckle for cracks, breaks, excessive wear, of any other defect. Measure diameter of king pin holes. Diameter should be 1.242 to 1.247 inches.

(4) Inspect spindle for cracks, distortion, damaged threads, excessive wear, or any other defect.

(5) Inspect axle beam for cracks, distortion, or any other defect.

(6) Inspect all other parts, including attaching hardware, for cracks, breaks, damaged threads, distortion, excessive wear, or any other defect.

d. Reassembly. Reassemble front axle assembly in reverse numerical sequence shown in figure 8-6.

e. Installation.

(1) Install front axle assembly as shown in figure 8-5.

(2) Install each wedge brake assembly as shown in figure 3-113.

(3) Install each service chamber (para 3-124).

(4) Install each hub and brake drum (para 3-122).

(5) Install front wheels (para 3-121).

(6) Install tow bar (para 3-132).

(7) Adjust tie rods (fig. 3-123).

8-8. Rear Axle Assembly

a. Removal.

(1) Remove rear wheels (para 3-121).

(2) Remove each hub and brake drum (para 3-122).

(3) Remove each spring brake-service chamber assembly (para 3-123).

(4) Remove each wedge brake assembly as shown in figure 3-113.

(5) Remove rear axle assembly as shown in figure 8-7.

b. Disassembly. Disassemble parking brake actuating mechanism (para 3-129).

c. Cleaning, Inspection, and Repair.

(1) Clean all parts using a cleaning solvent that is in accordance with Federal specification P-D-680. Dry parts thoroughly.

(2) Inspect spindle for cracks, breaks, excessive wear, distortion, or any other defect.

(3) Inspect axle beam for cracks, distortion, or any other defect.

(4) Inspect all other parts, including attaching hardware, for cracks, damaged threads, distortion, or any other defect.

d. Reassembly. Reassemble parking brake actuating mechanism (para 3-129).

e. Installation.

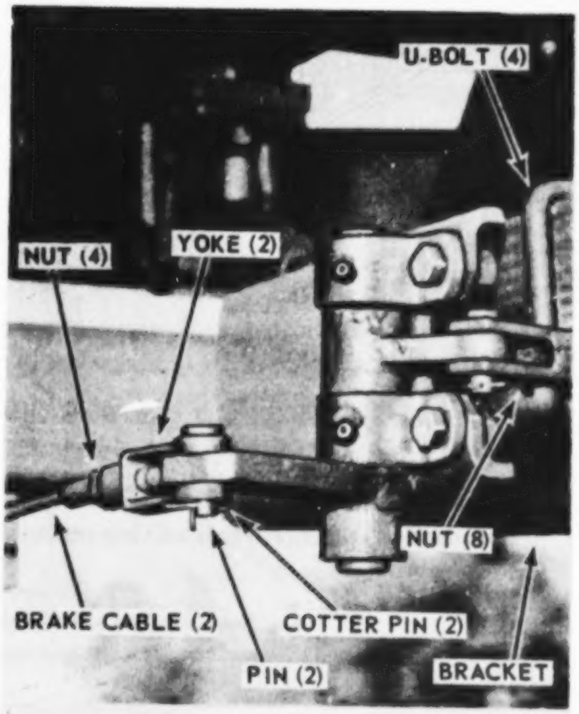
(1) Install rear axle assembly as shown in figure 8-7.

(2) Install each wedge brake assembly as shown in figure 3-113.

(3) Install each spring brake-service chamber assembly (para 3-123).

(4) Install each hub and brake drum (para 3-122).

(5) Install rear wheels (para 3-121).



ME 4310-338-15/8-7

REMOVAL

STEP 1. REMOVE COTTER PINS AND PINS. REMOVE YOKES AND NUTS. REMOVE PARKING BRAKE CABLES.

STEP 2. REMOVE NUTS, BRACKETS, AND U-BOLTS. REMOVE AXLE ASSEMBLY.

INSTALLATION

STEP 1. PLACE AXLE ASSEMBLY IN MOUNTING POSITION AND SECURE WITH BRACKETS, U-BOLTS, AND NUTS.

STEP 2. INSTALL PARKING BRAKE CABLES AND SECURE WITH NUTS. INSTALL YOKES, PINS, AND COTTER PINS.

Figure 8-7. Rear axle assembly; removal and installation.

APPENDIX A
REFERENCES

A-1. Fire Protection

TB 5-4200-200-10	Hand Portable Fire Extinguishers Approved for Army Users.

A-2. Lubrication

C9100-IL	Fuels, Lubricants, Oils and Waxes.
LO 5-4310-338-12	Lubrication Order

A-3. Maintenance

TB ORD 651	Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems.
TM 38-750	Army Equipment Procedures.
TM 5-4310-338-20P	Organizational Maintenance Parts Manual.
TM 5-4310-338-35P	Direct Support, General Support, and Depot Maintenance Parts Manual.
TM 5-764	Electric Motor and Generator Repair.
TM 9-1870-1	Care and Maintenance of Pneumatic Tires.
TM 9-6140-200-15	Operation and Organizational, Field and Depot Maintenance: Storage Batteries, Lead-Acid Type.

A-4. Painting

TM 9-213	Painting Instructions for Field Use.

A-5. Radio Suppression

TM 11-483	Radio Interference Suppression.

A-6. Shipment and Storage

TB 740-93-2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage.
TB 740-93-3	Administrative Storage of USAMEC Mechanical Equipment.

APPENDIX B
BASIC ISSUE ITEMS LIST

B-1. Scope

This appendix lists items which accompany the air compressor unit or are required for installation, operation, or operator's maintenance.

B-2. General

This Basic Issue Items List is divided into the following sections:

a. Basic Issue Items — Section II. This is a list of items which accompany the air compressor unit which are required by the operator/crew for installation, operation, or maintenance.

b. Maintenance and Operating Supplies—Section III. This is a listing of maintenance and operating supplies required for initial operation.

B-3. Explanation of Columns, Section II.

The following is an explanation of columns in the tabular list of Basic Issue Items, Section II.

a. Source, Maintenance, and Recoverability Codes (SMR); Column (1).

(1) The source code indicates the selection status and source for the listed item. The source code is:

Code	*Explanation*
P	Applied to repair parts which are stocked in or supplied from GSA/DSA or Army supply system, and authorized for use at indicated maintenance categories.

(2) The maintenance code indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	*Explanation*
C	Operator/Crew

(3) The recoverability code indicates whether unserviceable items should be returned for recovery or salvage. The items on this list are not coded and are expendable.

b. Federal Stock Number (FSN); Column (2). This column indicates the federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description, Column (3). This column indicates the federal item name and any additional description of the item required.

d. Unit of Measure (U/M), Column (4). The unit of measure is a two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based (e.g., ft, ea, pr, etc).

e. Quantity Incorporated in Unit, Column (5). This column indicates the quantity of the item used in the functional group. A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated (e.g., shims, spacers, etc.).

f. Quantity Furnished with Equipment, Column (6). This column indicates the quantity of an item furnished with the equipment.

g. Illustration, Column (7). This column is divided as follows:

(1) *Figure number, column (7) (a).* This column indicates the figure number of the illustration in which the item is shown.

(2) *Item number, Column (7)(b).* This column indicates the callout number used to reference the item in the illustration.

B-4. Explanation of Columns, Section III.

The following is an explanation in the tabular list of Maintenance and Operating Supplies, Section III.

a. Component Application, Column (1). This column identifies the component application of each maintenance or operating supply item.

b. Federal Stock Number, Column (2). This column indicates the federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description, Column (3). This column indicates the item name and brief description.

d. Quantity Required for Initial Operation, Column (4). This column indicates the quantity of each maintenance or operating supply item required for initial operation of the equipment.

e. Quantity Required for 8 Hours Operation, Column (5). This column indicates the estimated quantities required for an average 8 hours of operation.

f. Notes, Column (6). This column indicates informative notes keyed to data appearing in a preceding column.

B-5. Abbreviations

qt	quart
gal	gallon
lb	pound

Section II. BASIC ISSUE ITEMS

(1) SMR code	(2) Federal stock number	(3) Description	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration	
						(A) Fig No.	(B) Item No.
		Group 31 — Basic Issue Items Manufacturer Installed 3100 Basic Issue Iems Manufactured or Depot Installed					
PC	7520-559-9618	Case, Maintenance and Operational Manual MIL-E-11743	EA		1		
		Department of the Army: Maintenance Manual TM 5-4310-338-15	EA		1		
		Lubrication Order LO 5-4310-338-12	EA		1		
		Group 32 — Basic Issue Items Troop Installed 3200 Basic Issue Items, Troop Installed or Authorized					
PC	4210-555-8837	Extinguisher, Fire Monobromotrifluoromethane: Charge Hand Type, Penetrating Seal Valve, w/Bracket, 2¾ lb. MIL-E-52031	EA				

Section III. MAINTENANCE AND OPERATING SUPPLIES

(1) Component application	(2) Federal stock number	(3) Description	(4) Quantity required f/initial operation	(5) required f/8 hrs operation	(6) Notes
Crankcase Engine		Lubricating Oil: 55 Gal Drum as follows:			(1) Includes quantity of oil to fill engine oil system as follows: 27 qts — Engine 2 qts — Oil Filter (2) See C9100-IL for additional data and requisitioning procedures. (3) See Current 2. O. for grade application and replenishment intervals. (4) Average Fuel consumption is 11 gal per hour of continuous operation. (5) Ref. TM 5-4310-338-15 Table 2-1
	9150-680-1104(2)	HDO-30	29 qt		
	9150-680-1105(2)	HDO-10	29 qt		
	9160-242-7605(2)	OES	29 qt		
Grease Points		Grease, Automotive and Artillery: 5 lb can as follows:	5 lb	(3)	
Fuel Tank		Fuel, Diesel: Bulk as follows:			
	9140-286-5294(2)	DF-2	119 gal	(4)	
	9140-286-5286(2)	DF-1	119 gal	(4)	
	9140-286-5283 (2)	DFA	119 gal	(4)	
Oil Separator, Compressor		Lubricating Oil: 55 gal drum as follows:			
	9150-9437(2)	OE-30	104 qts	(3)	
	9150-265)9430(2)	OE-10	104 qts	(3)	
	9150-242-7605(2)	OES	104 qts	(3)	
Radiator		WATER	66 qts		
		ANTIFREEZE 5 gal can as follows:			
	6850-224-8730	ETHYLENE GLYCOL type 1	(5)		
		ANTIFREEZE: 55 gal drum as follows:			
	6850-174-1806	Arctic grade	66 qts		

APPENDIX C
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C-1. General

This appendix contains the Maintenance Allocation Chart (MAC) which designates the overall responsibility for the performance of maintenance functions on specification assemblies and components. Strict compliance to the maintenance functions shall be observed by personnel in each echelon of maintenance.

a. Section I provides a general explanation of the Maintenance Allocation Chart and a general explanation of all maintenance and repair functions at the various authorized levels of maintenance. This explanation includes definitions of symbol designations and maintenance functions that appear in Section II.

b. Section II designates overall responsibility for the performance of maintenance operations on the identified end item or component. The levels of maintenance are designated by letters under the applicable maintenance of functions with double letter designations in the remarks column for additional maintenance procedures.

c. Section III lists the special tools and test equipment required for each maintenance operation as referenced from Section II.

d. Section IV contains supplemental instructions or explanatory notes required for a particular functional group. These instructions are designated by a double letter combination appearing in the remarks column in Section II.

C-2. Explanation of Columns in Section II

a. Column (1), Group Number. This number represents the functional group in which each assembly or component is classified (TB 750-93-1). The numbers are arranged in numerical sequence.

b. Column (2), Functional Group. This column contains the nomenclature for the components of each functional group number.

c. Column (3), Maintenance Functions. This column lists the various maintenance functions (A through K) and indicates the lowest maintenance category authorized to perform these functions.

The symbol designation for the various maintenance levels are defined as follows:

C — Operator or Crew
O — Organizational Maintenance
F — Direct Support Maintenance
H — General Support Maintenance
D — Depot Maintenance

The maintenance functions are defined as follows:

A — Inspect: To determine the overall condition of a component by comparing its physical, mechanical, and electrical characteristics with established standards.

B — Test: To verify the operating condition of a component and to check for equipment malfunction by the use of test equipment.

C — Service: To clean, to preserve, to charge, to paint, and to add fuel, lubricants, cooling agents, and air.

D — Adjust: To rectify the equipment to the extent necessary to bring it into the proper operating range.

E — Align: To adjust specific variables of a component to achieve optimum performance.

F — Calibrate: To determine corrections to be made to the equipment as determined by test equipment readings. Consists of adjusting the performance or operation of a component to match the performance of an accurate standard known to be properly calibrated.

G — Install: To set up for use, to attach as to make operational.

H — Replace: To substitute an operational part or component in place of a non-operational part or component.

I — Repair: To restore an item to an acceptable operational condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.

J — Overhaul: To restore an item to a completely operational condition as prescribed by maintenance operational standards using the Inspect and Repair Only as Necessary (IROAN) technique.

K — Rebuild: To restore an item to a standard as nearly as possible to original or new condition in appearance, performance and life expectancy. This is accomplished through complete disassembly of the item, inspection of all parts, repair or replacement of worn or unserviceable parts using original manufacturing tolerances and specifications, and subsequent reassembly of the item.

d. Column (4), Tools and Equipment. This column is not applicable for this particular air compressor unit.

e. Column (5), Remarks. This column is provided for referencing by code the remarks pertinent to the maintenance functions. The code consists of two letters separated by a dash. The first letter represents the alphabetical sequence of the remarks; the second letter references a maintenance function in column (3).

Section II. MAINTENANCE ALLOCATION CHART

(1)	(2)	(3) Maintenance functions											(4)	(5)
Group No.	Functional group	A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	Tools and equipment	Remarks
01	ENGINE													
0100	Engine Assembly:	O	F	C	O				F	F	H	D		A-B
0101	Crankcase, Block, Cylinder Head:													
	Block								H	H				
	Head, cylinder								F	F	H			
	Liners, cylinder								H	H				
	Chambers, precombustion								F					
	Plugs, glow		O						O					
0102	Crankshaft:													
	Crankshaft								H			D		B-K
	Bearings, main								H					
	Seals, oil								H					
	Damper, vibration								F					
0103	Flywheel Assembly:													
	Flywheel								F	F				
	Gear, ring, flywheel	F							F					C-I
	Housing, flywheel								F					
0104	Pistons, Connecting Rods:													
	Bearings, connecting Rod	H							H					
	Pistons, rings, pins, and retainers	H							H					
	Rod, connecting								H					
0105	Valves, Camshaft, and Timing System:													
	Valves				O				F	F				
	Seats, valve								F	F				
	Guides, springs, and locks								F	F				
	Arms, rocker								F	F				
	Cover, valve								O	O				D-J
	Lifters, valve				H				H	H				
	Rods, push								H					
	Bearings, camshaft	H							H					
	Camshaft	H							H					
	Gears, timing	H							H					
	Cover, timing gear								H					
	Thrust washer, cover	H							H					
0106	Engine Lubrication System:													
	Pump assembly, oil								F	F	H			
	Cooler, oil								O	F				
	Filter, oil			C					O	F				
	Elements, oil filter			C					C					
	Breather, crankcase			C					C					
	Oil pan and plate	O		C					F	F				
	Lines and fittings	O							O'	O				
0108	Manifolds:													
	Exhaust	O							O	F				
0109	Accessory Drive Mechanisms:													
	Drive assembly, fuel injection pump and fuel transfer pump								F	F				
03	FUEL SYSTEM													
0301	Fuel Injectors:													
	Valves, fuel injection		F						O	O				
0302	Fuel Pumps:													
	Housing assy, fuel injection pump			F					F	F				
	Pump, fuel injection			F		H			F	F	H			
	Pump, fuel transfer								O	F	H			
0304	Air Cleaner:													
	Cleaner assembly air			C					O	O				
	Element, air cleaner	C		C					C					

(1)	(2)	(3) Maintenance functions											(4)	(5)
		A	B	C	D	E	F	G	H	I	J	K		
Group No.	Functional group	Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
	Hoses and clamps	C							O					
	Cap, air cleaner	C							O					
0305	Turbocharger:													
	Turbocharger assembly								O	F		H		
	Piping, turbocharger	C							O					
	Tanks, Lines, and Fittings:													
	Fuel tanks	O		O					O	F				
	Lines and fittings, fuel	O		O					O	O				
0308	Engine Speed Governor and Controls:													
	Governor assembly		F		F		H		F	F		H		
0309	Fuel Filters:													
	Valve, fuel bypass								O	O				
	Tank, fuel filter								O					
	Filter, fuel; primary			C					O	O				
	Element, primary			C					C					
	Filter, fuel; final			C					O	O				
	Element, final			C					C					
0311	Engine Starting Aids:													
	Aid, cold weather starting	C	O	C					O	O				
	Cylinder, fuel	C		C					C					
0312	Accelerate, Throttle, or Choke Controls:													
	Lever, throttle Run-Start			O					O					
04	EXHAUST SYSTEM													
0401	Exhaust, Pipe:													
	Pipe, exhaust	C							O					
	Shield, rain	C							O					
05	COOLING SYSTEM													
0501	Radiator:													
	Radiator assembly	C		C					F	F				
	Cap, radiator	C							C					
0503	Water Manifold, Headers, Thermostat, and Housing Gaskets:													
	Hoses, radiator	O							O					
	Clamps, hose	O							O					
	Regulator, water temperature		O						O					
0504	Water Pump:													
	Water pump assembly								O	F		F		
	Kit, repair									F				
0505	Fan Assembly:													
	Fan assembly			C					O					
	Belts, drive				O				O					
	Guard, fan	O							O					
	Pulley, fan					O			O					
06	ELECTRICAL SYSTEM													
0601	Generator Assembly:													
	Generator assembly		F	O					O	F		H		
	Belts, drive				O				O					
	Brushes	O							O					
	Kit, Repair									F				
	Pulley	O				O			O					
0602	Generator Regulator:													
	Generator regulator assembly		F						O	F				
	Kit, repair									F				
0603	Starting Motor:													
	Starting motor assembly		F	O					O	F		H		
	Brushes	O							O					
	Solenoid and switches	O							F	F				
	Kit, repair									F				

(1)	(2)	(3) Maintenance functions											(4)	(5)
Group No.	Functional group	A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	Tools and equip-ment	Remarks
0606	Engine Safety Controls:													
	Switch, overspeed governor				O				O	F				
	Switch, low oil pressure								O					
	Switch, high water temp								O					
	Switch, fuel pressure								O					
	Switch, air pressure								O					
	Solenoid, engine shutdown								O					
0607	Instrument Panel and Instruments:													
	Panel assembly, instrument								O					
	Ammeter	C							O					
	Gage, fuel level	C							O					
	Panel light and lamp	C							O					
	Switches	C							O					
	Harness, wiring	C							O	F				
0609	Lights:													
	Lights; tail, marker, and clearance	C							O	O				
	Lamps	C							C					
0610	Sending Units and Warning Switches:													
	Fuel sending unit	C	O						O					
0612	Batteries, Storage:													
	Batteries		O	C					O					
	Cables, battery	C							O					
	Tray, battery (housing)	C							O					
	Receptacle, battery charging	C	O						O					
0613	Hull or Chassis Wiring Harness:													
	Harness, wiring (all)	C							F	O				
0615	Radio Interference Suppression:													
	Grounding straps, lockwashers, and shielded cables		O						O	O				
10	FRONT AXLE													
1000	Front Axle Assembly:													
	Axle, front			C					F	F				
	Chains, safety								O					
11	REAR AXLE													
1100	Rear Axle Assembly:													
	Axle, rear			C					F	F				
12	BRAKES													
1201	Hand Brakes:													
	Lever, hand brake	C		C					O					
	Clevis pins and linkage	C		C	O				C					
1202	Service Brakes:													
	Wedge brake assemblies			C	O				F	F		F		
1206	Mechanical Brakes:													
	Spring Brake-Service Chamber Assemblies				O				O	F		F		
1207	Air Brake System:													
	Service chambers	C							O	F		F		
	Reservoir, air	C							O					
	Valve, emergency relay	C							O	F				
	Lines, hoses, and fittings	C							O	O				
1211	Trailer Brake Connections and Controls:													
	Couplings, intervehicular	C							O					
	Hose assemblies	C							O	O				
13	WHEELS													
1311	Wheel Assemblies:													
	Wheels	C		C					O	F				
	Bearings	O		O					O					
	Brake drums and hubs	O		O					O	F				

(1)	(2)	(3) Maintenance functions											(4)	(5)
Group No.	Functional group	A Inspect	B Test	C Service	D Adjust	E Align	F Calibrate	G Install	H Replace	I Repair	J Overhaul	K Rebuild	Tools and equipment	Remarks
1313	Tires and Tubes:													
14	STEERING													
1401	Steering Assembly:													
	Tie rods and yokes				O				O					
	Center steering arm			C					F	F				
	Spindles, knuckles, king pins, and yoke pins			C					F	F				
	Lubrication fittings			C					O					
15	FRAME													
1501	Frame Assembly:													
	Frame assembly, main	O							H	F		H		
1503	Pintles and Towing Attachments:													
	Towbar	O							O	F				
16	SPRINGS AND SHOCK ABSORBERS													
1601	Springs:													
	Springs, front and rear	C							O	F				
18	BODY, HOOD, AND HULL													
1801	Housing Group:	O							O	O				
22	BODY, CHASSIS, OR HULL, AND ACCESSORY ITEMS													
2202	Accessory Items:													
	Reflectors	C							O					
	Harness, intervehicular wiring								O	O				
2210	Data Plates and Instruction Holders:													
	Plates, data	C							O					
	Plates, instruction, caution, and identification	C							O					
	Decals, instruction	C							O					
47	GAGES (NON-ELECTRICAL)													
4701	Instruments (Speed and Distance):													
	Tachometer-hourmeter	C							O					
	Tachometer cables	C		C					O					
4702	Gages, Mountings, Lines, and Fittings:													
	Gage, air pressure	O							O					
	Gage, separator oil level	C							O					
	Indicators, air cleaner restriction.	C							O					
	Gage, oil pressure	C							O					
	Gage, fuel pressure	C							O					
	Gage, water temperature	C							O					
	Lines and fittings	C							O					
4703	Hourmeter:													
	Tachometer-hourmeter	C							O					
	Service meter	C							O					
50	PNEUMATIC EQUIPMENT													
5000	Air Compressor Assembly:	O	F	C					F	F	H	D		
5001	Crankcase, Block, Cylinder Head:													
	Stator, air compressor	F							F	F	H			
5004	Rotor:													
	Rotor	F							F					
	Bearings	F							F					
	Shaft, rotor	F							F					
	Blades, rotor	F							F					
	Sleeves, seal	F							F					
5006	Lubrication System:													
	Oil Separator assembly	O		C					F	F				
	Element, oil separator	F							F					

(1)	(2)	(3) Maintenance functions											(4)	(5)
		A	B	C	D	E	F	G	H	I	J	K		
Group No.	Functional group	Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	Tools and equipment	Remarks
	Oil filter assembly			C					O	O				
	Element, oil filter	C		C					C					
	Cooler, oil	O							F					
	Valves, relief, stator	O							F	F				
	Oil lines and fittings	C							O					
	Thermal bypass valve assembly	O							O	F				
5007	Compressor Drive:													
	Coupling	F							F					
	Straps, locking	F							F					
	Bushings	F							F					
	Pins	F							F					
5008	Air Intake:													
	Air cleaner assemblies			C					O	O				
	Element, air cleaner	C		C					C					
	Hoses and clamps	C							O					
	Cap, air cleaner	C							O					
5009	Unloader System Components:													
	Pressure regulator, air	O			O				O	F		F		
	Valve, minimum pressure	O							O	O				
	Valve, blowdown	O							O	O				
	Valve, relief, safety	C							O					
	Strainer, air line	O							O					
	Lines and fittings	C							O	O				
	Valve, intake control	F							F	F				
	Diaphragm, intake control	F							F					
	Connections, discharge	O							O					
5012	Throttling Devices:													
	Speed control linkage				O				O					
	Moisture separator assembly	C		C					O	O				
	Element, moisture separator	C		C					C					
5015	Air Discharge System:													
	Manifold, piping, valves, and fittings	C							O	O				

Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS

Reference code	Maintenance level	Nomenclature	Tool number
		No Special Tools Required	

Section IV. REMARKS

Reference code	Remarks
A-B	Test includes operation and compression.
B-K	Rebuilding of crankshaft includes metalizing, aligning and grinding.
C-I	Replace ring gear.
D-J	Repair of valves and inserts includes refacing.

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By Order of the Secretary of the Army:

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